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Volume 53 Number 12

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NOV. '60

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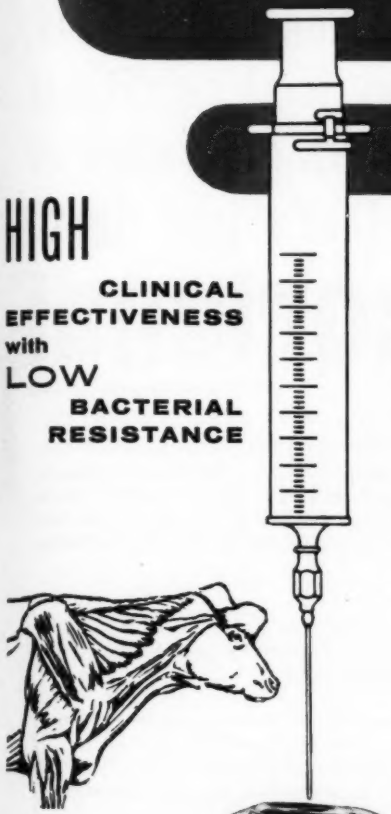

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Vol. 53 No. 12

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ULTRACORTENOL has been extensively tested and enthusiastically accepted by a number of small- and large-animal practitioners[1-10] who found these regimens to be highly effective:

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	Shock ("downer" cow) syndrome	Single 200-mg. injection as supportive therapy.
Dog	Dermatoses	5 mg./10 pounds body weight, total single dose not to exceed 20 mg. For sustained therapy, repeat once or twice a week as indicated.
	Inflammatory joint conditions	5 mg./10 pounds body weight, total single dose not to exceed 20 mg. Supportive oral therapy not necessary.

*This initial injection may be reduced to 50 to 100 mg. intramuscularly if simultaneous administration of intravenous glucose is given, thus permitting more economical glucocorticoid therapy. If necessary, either regimen may be augmented by an additional injection of 50 to 100 mg. Ultracortenol after 24 to 48 hours.

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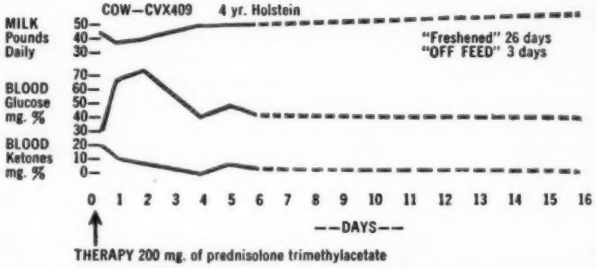
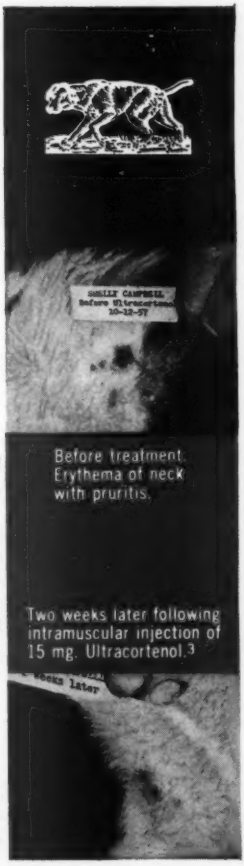
- appetite is restored, depression is dispelled within 12 to 24 hours[1]
- blood glucose levels are raised within 12 hours[1]
- blood ketone levels return to normal within 24 to 96 hours[1]
- a steady increase in milk production begins after 48 hours.[2]



This chart shows the good response in ketotic cow following intramuscular injection of 200 mg. of Ultracortenol. (Adapted from Vigue[1])

CANINE DERMATOSES Reporting on 9 animals (of whom 6 received 15 or 20 mg. Ultracortenol in a **single** intramuscular dose), Pollock[3] says, ". . . Ultracorten Trimethylacetate [Ultracortenol] proved effective not only against the seemingly innocuous lesions, but also against the hemorrhagic dermatitis associated with exquisite pain." And, "The duration of the anti-inflammatory phase varies from seven to ten days depending upon the dosage. . . ."[3]


Before treatment. Erythema of neck with pruritis.
Two weeks later following intramuscular injection of 15 mg. Ultracortenol.[3]

References: 1. Vigue, R. F.: J.A.V.M.A. 133:326 (Sept. 15) 1958. 2. Shaw, J. C.: Personal communication. 3. Pollock, S.: To be published. 4. Rabin, P. H.: Personal communication. 5. Hoffer, S. H.: Personal communication. 6. Weir, H. T., and Hazelrig, J. W.: Personal communication. 7. Beck, J. W.: Personal communication. 8. Bull, W. S.: Personal communication. 9. Fessenden, P. E.: Personal communication. 10. Lohmeyer, C.: Personal communication.

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CANINE FILARIASIS

G. F. Otto, D.V.M. and P. M. Bauman, D.V.M.

The writers present a searching review of the heartworm problem, and suggest treatment as well as preventive measures.

RESPONSE OF THE BOVINE TO THE INTRODUCTION OF SALMONELLA PULLORUM ANTIGEN

I. D. Porterfield, Ph.D., W. E. Petersen, Ph.D., D.Sc., and Berry Campbell, Ph.D.

Cows from a milking herd treated with an antigen of Salmonella pullorum *enabled researchers to study the effect of the infusion of an antigen into the udder. Antibody titer of the colostrum is usually higher than that of blood serum at time of parturition. Various ramifications are discussed.*

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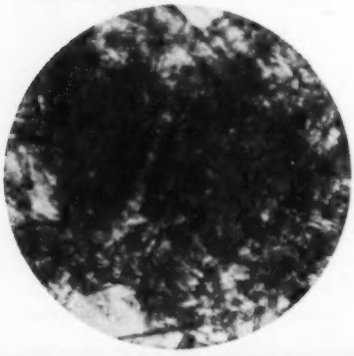

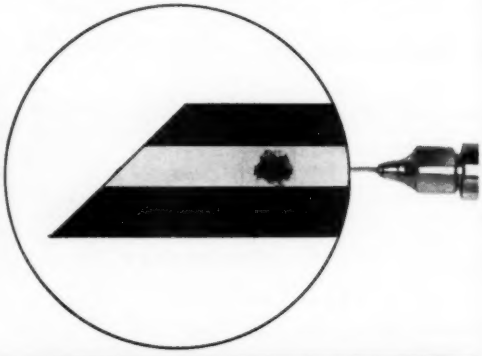

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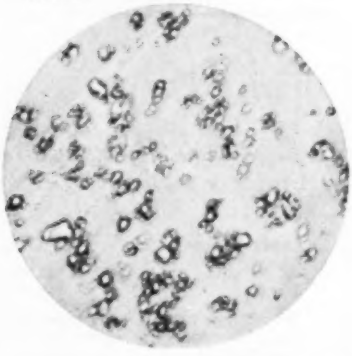

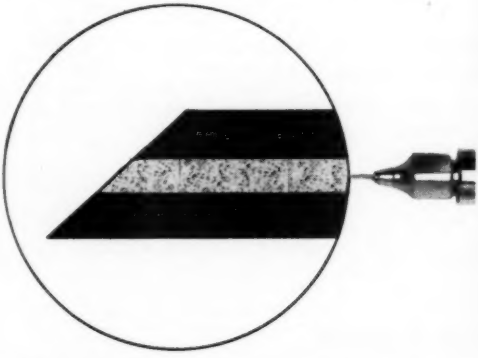

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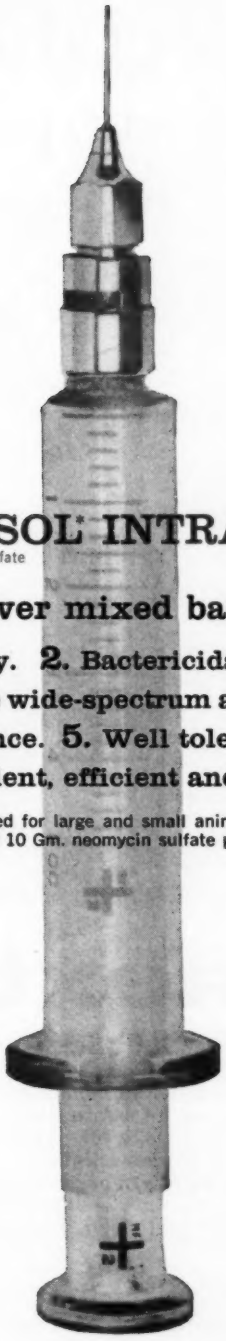

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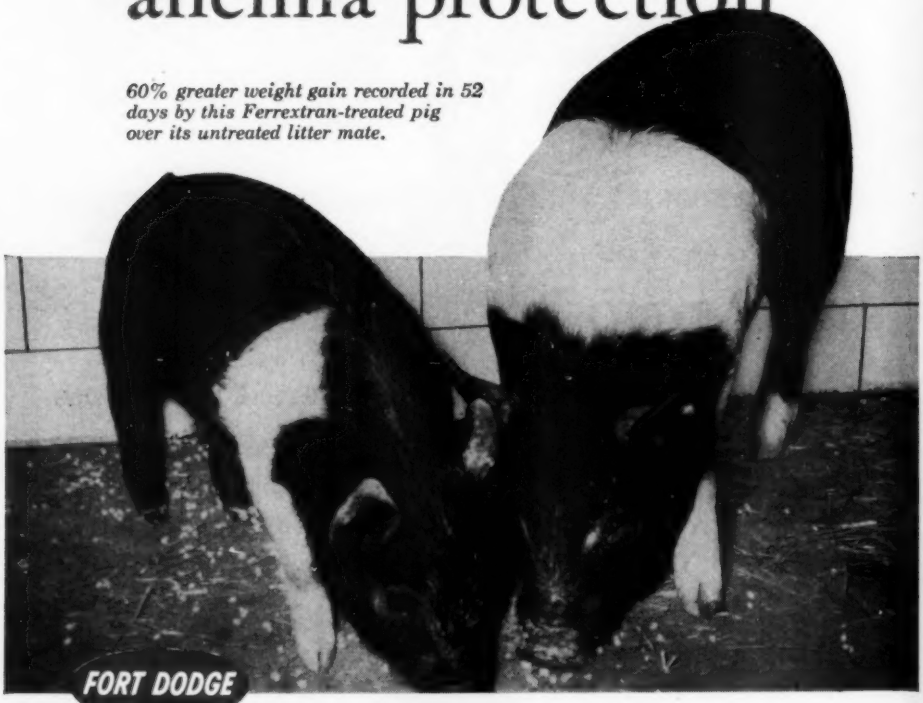

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1. Belloff, G. B.: Calif. Vet. 9:27 (Sept.-Oct.) 1956. 2. Mosier, J. E.: Vet. Med. 52:445 (Sept.) 1957.

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References: 1. Kakavas, J. C.; Roberts, H. D. B.; de Courcy, S. J. and Ewing, D. L.: J. Am. Vet. M. Ass. 119:203 (Sept.) 1951. 2. Kakavas, J. C.: Antibiotics Annual 1954-1955, New York, Medical Encyclopedia, Inc., 1955, p. 323. 3. Mires, M. H. and Chadwick, R. H.: Vet. News 10:3 (Jan.-Feb.) 1947. 4. Mires, M. H.: J. Am. Vet. M. Ass. 117:49 (July) 1950. 5. Mires, M. H.: Vet. News 14:9 (May-June) 1951. 6. Roberts, H. D. B.; Kakavas, J. C. and Biddle, E. S.: N. Amer. Vet. 34:247 (April) 1953.

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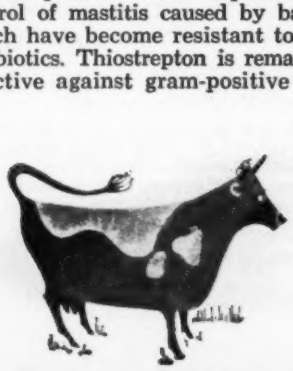

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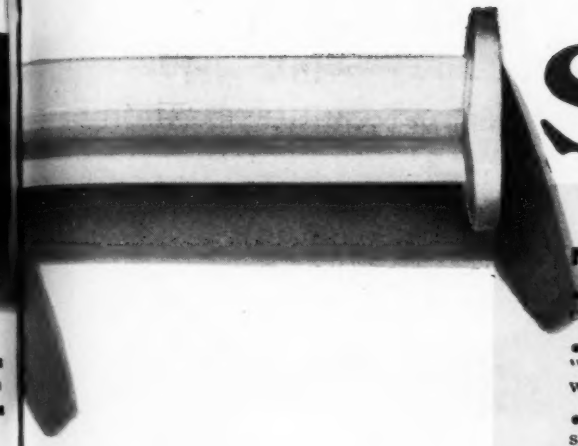

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Triple Sulfas	▨	▨	▨	▨	▨	▨	▨	▨	
Penicillin	▨	▨	▨	▨			▨	▨	
Streptomycin			▨	▨	▨	▨	▨	▨	
Neomycin	▨		▨		▨	▨	▨	▨	▨
Brand A BROAD SPECTRUM ANTIBIOTIC	▨	▨	▨	▨	▨	▨	▨	▨	
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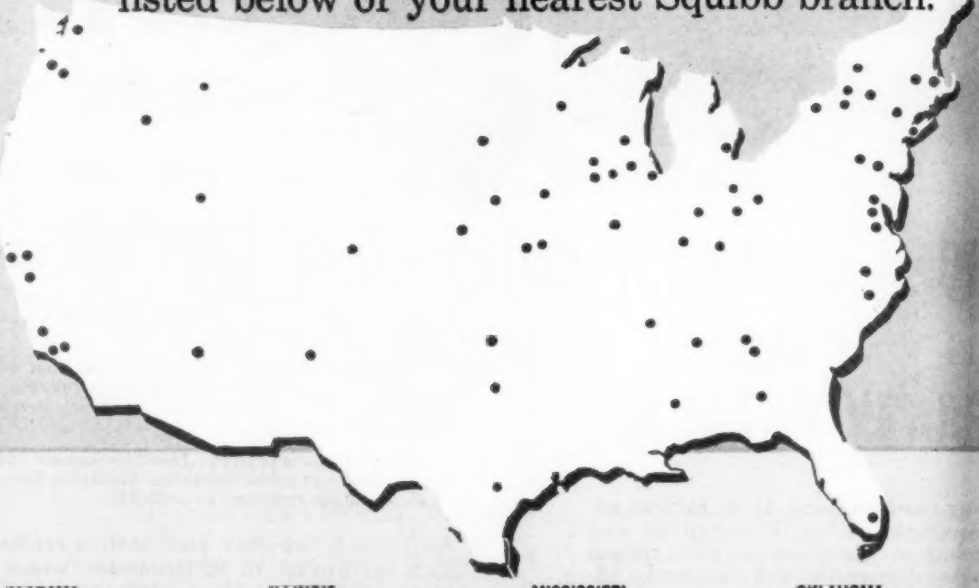

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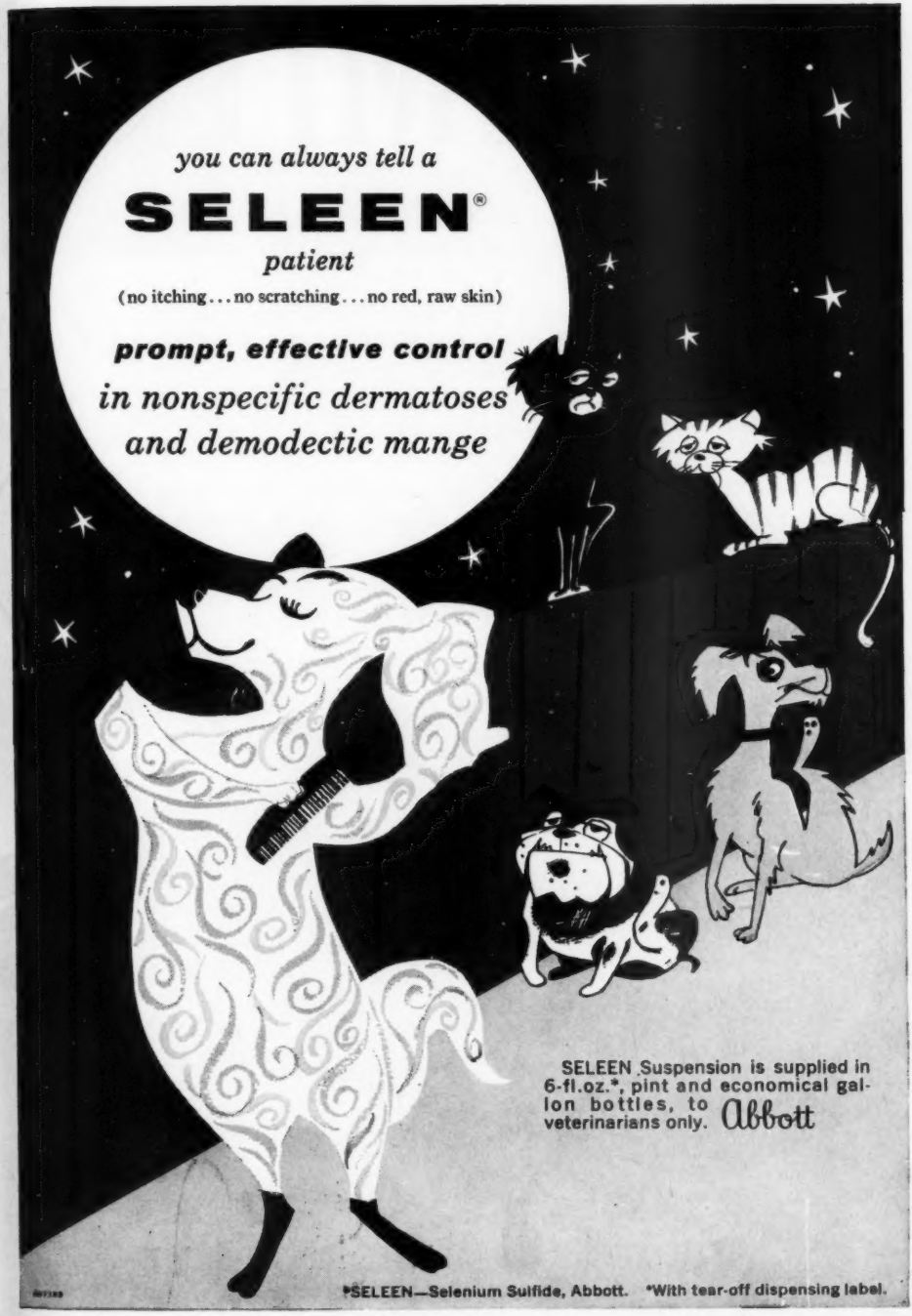
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News Comment

Piperazine Phosphate Supplementation

Florida investigators reported that pigs supplemented continuously with 40 gm. piperazine phosphate per 100 lb. of feed gained significantly faster than controls. They also consumed more feed and converted it to gain more efficiently. A level of 20 gm. proved ineffective in improving either rate or efficiency of gain. Piperazine supplementation did not appear to exert an anthelmintic effect as judged by worm counts made at the termination of the trial. Report of the above results was presented at the Third Annual Swine Field Day held recently at Gainsville.

Overfat Ewes

Ewes that are overfat at breeding time are hard to settle. They can be reduced by being put on short pastures or in dry lot on short ration without grain.

Vesicular Disease

A new vesicular disease with ulcers in and around the mouth, lack of appetite and loss of weight as chief signs has been reported in several Indiana herds. Named infectious bovine ulcerative stomatitis, it is caused by a virus, and is not dissimilar to mucosal disease or virus diarrhea, although an entirely different ailment. A similar disease condition has been reported from New York and Pennsylvania.

Penicillin Mastitis Ointment

A ban on farmer use of penicillin in the treatment of mastitis may be in the wind, according to Food and Drug Administration report. A nationwide survey is now being conducted to determine if any penicillin shows up in fluid market milk. Previous tests have indicated that as high as 12% of some samples contained the antibiotic. If significant amounts of residual penicillin are evident in milk samples, a ban may be imposed on farmer use of the drug.

Color of Herefords

No correlation between color of Hereford cattle and rate of gain has been discovered in studies conducted at the South Dakota Experiment Station. It had been popularly believed among livestock growers that lighter colored Herefords did better in the feedlot.

Acetonemia and Silage

Silage which contains butyric acid is a significant factor in development of ketosis, or acetonemia, according to Cornell University scientists. In studies, it developed that ketone body content of silage varies considerably with particularly high levels occurring in grass silage which contains excessive amounts of butyric acid. In the Cornell studies, recoveries with usual treatment occurred after grass silage was replaced with good quality hay. Others responded poorly.

Radiostrontium Count

The radiostrontium count in the nation's milk supply is still increasing. According to latest Public Health Service figures, the range in July was 3.3 to 18.7 micromicrocuries/liter, as compared with 3.3 to 10 in May. The Public Health Service said the levels are well within maximum permissible concentrations, although these concentrations are still a subject of considerable controversy. It also disclosed that four new sampling stations have been set up in Georgia, Texas, North Dakota and Illinois, and still another is slated for Washington.

Cobalt Pellets

Long-lasting cobalt pellets show great promise in combating the serious ruminant deficiency disease commonly known as pining. First reported in Nature by Dewey, Lee and Marston, the new approach consists of administration of a heavy cobalt oxide pellet orally which remains in the reticulum and allows release of sufficient cobalt for nutritional requirements over a period of at least nine months.

These pellets are already in extensive use on the west coast of Ireland and other cobalt deficient areas of the world. Use has been largely in sheep but equal effectiveness is anticipated in cattle. The unique administration method suggested possible application to other medication and nutrients required in low dosage over a long period of time.

Pre-slaughter Tranquilizer

Use of a tranquilizer to ease the stress of meat animals on their way to slaughter has been approved by the government for the first time. The Food and Drug Administration has approved the use of Diquel (Jen-Sal) on cattle up to 24 hours prior to slaughter.

Cyanamid reports to the veterinarian:

CYVAC* the new Cyanamid vaccine for canine distemper-hepatitis now is available from your regular distributor. This is our standard AVIANIZED(R) Canine Distemper Vaccine combined with a new hepatitis fraction.

CYVAC is an improvement over existing bivalent vaccines for these two diseases. Both antigens are modified live viruses. The hepatitis fraction has been modified by serial passage on an unnatural host — swine kidney.

Test results in the laboratory and in the field have been excellent. These antigens will stimulate the production of a good immunity capable of withstanding severe challenge.

We hope you will give CYVAC a complete and critical trial in your practice. The dosage is 2 cc., subcutaneously regardless of age or breed. Packaged in cartons of 10 individual doses.

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new "far superior" treatment for retained placenta

Therapeutic failure, frequently encountered in retained placenta, can be prevented—with new FUREA Veterinary which combines the potent wide-range bactericidal and deodorizing action of FURACIN* (brand of nitrofurazone) with the cleansing action of urea. FUREA Veterinary boluses disintegrate readily and are nonirritating and nontoxic.

In retained placenta, treatment with FUREA has produced quick improvement of the general condition of the cow with lessening or elimination of malodor. Fertility rate remained unimpaired in over 90% of treated cows.*

SUPPLIED: Each bolus contains 0.12 grams of FURACIN and 12 grams urea. Bottle of 25.

DOSE: Two boluses inserted into the recently pregnant horn. One bolus may be placed in the non-pregnant horn.

*Jones, S. V.; Belloff, G. B., and Roberts, H. D. B.: Vet. Med. 51:413 (Sept.) 1956.

For vaginal infections, including those caused by Vibrio fetus, that may prevent conception, or cause abortion, dispense: FURACIN Suppositories Veterinary, large. Box of 12.

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new specific treatment for calf scours

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ENTEFUR contains the new nitrofuran, Furamazone® (brand of nifuraldezone) for rapid wide-spectrum bactericidal action against gram-positive and gram-negative enteric bacteria. ENTEFUR also contains bismuth subsalicylate for its mildly astringent, antidiarrheal action.

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REFERENCES: 1. Bull, W. S.: N. Amer. Vet., In press. 2. Henry, R. T., and Blackburn, E. G.: Vet. Med., In press.

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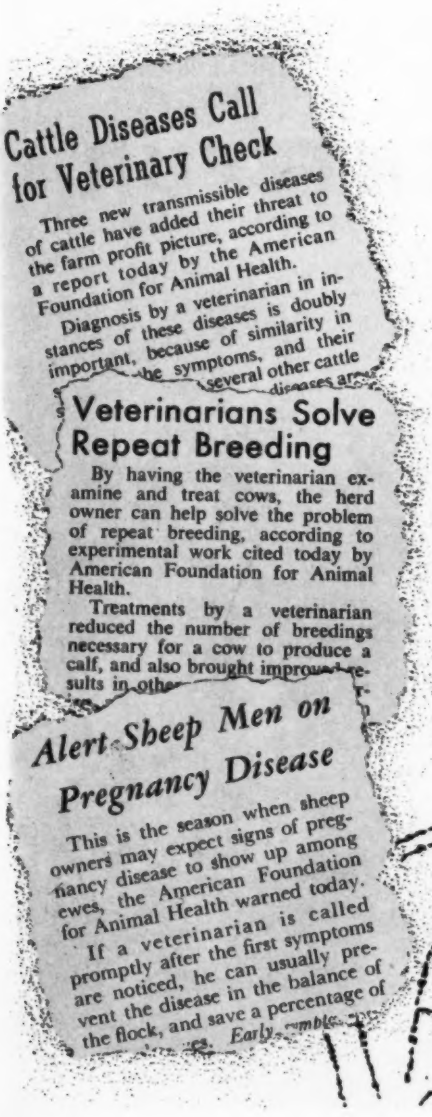

Cattle Diseases Call for Veterinary Check

Three new transmissible diseases of cattle have added their threat to the farm profit picture, according to a report today by the American Foundation for Animal Health.

Diagnosis by a veterinarian in instances of these diseases is doubly important, because of similarity in the symptoms, and their several other cattle

Veterinarians Solve Repeat Breeding

By having the veterinarian examine and treat cows, the herd owner can help solve the problem of repeat breeding, according to experimental work cited today by American Foundation for Animal Health.

Treatments by a veterinarian reduced the number of breedings necessary for a cow to produce a calf, and also brought improved results in other

Alert Sheep Men on Pregnancy Disease

This is the season when sheep owners may expect signs of pregnancy disease to show up among ewes, the American Foundation for Animal Health warned today.

If a veterinarian is called promptly after the first symptoms are noticed, he can usually prevent the disease in the balance of the flock, and save a percentage of

Tens of thousands of animal owners are now reading about modern veterinary service in their local newspapers. They are being alerted to animal disease hazards . . . and learning to call their veterinarian as the best safeguard against losses.

Nearly 3,700 newspapers are being furnished with this year 'round, coast-to-coast news service by American Foundation for Animal Health, the educational bureau of Associated Veterinary Laboratories. Yet this is but one of many steps in the nation-wide public relations campaign for the profession being underwritten by this group. Other phases include farm magazines, radio, television . . . every major channel of mass education.

This campaign is made possible by the ethical companies listed on the opposite page. It will be genuinely appreciated if you will bear them in mind in supplying your requirements.

IN THE NEWS
Unusual Lengths
Veterinarian is Key to Control of Erysipelas
A 3-point program to help farmers control swine erysipelas, now one of the top causes of heavy losses to hog producers, was recommended this week by the American Foundation for Animal Health.
First—In areas where erysipelas has occurred, a veterinarian should outline a planned, year 'round vaccination program for both breeding stock and growing pigs.
Second—If any unexplained, sudden deaths or suspicious symptoms are seen, prompt veterinary help should be obtained, in getting a correct diagnosis. This is important, as erysipelas is easily confused with hog cholera.
Third—Farmers should isolate newly-purchased swine, keeping them away from the home herd for at least three weeks. This will allow signs of the disease to develop in the new animals.
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Laboratory studies of milk samples submittted by practicing veterinarians indicate that most quarters of all udders consistantly contain various potential mastitis producing organisms. Findings and recommendations for a procedure whereby greater accuracy can be attained are reported.

Bacteriological Differentiation of Organisms Isolated From Mastitic and Non-Mastitic Mammary Secretions

K. L. KRAFFENHOFT,† M.S., A. PAUL ADAMS, Ph.D.
I. A. SCHIPPER, M.S., D.V.M.

North Dakota Agricultural Experiment Station
Fargo, North Dakota

THE LARGE VOLUME of literature on mastitis serves to identify the complex nature of this disease and difficulties involved in making a study of this udder infection. It would be impractical to completely review all material dealing with mastitis research. Reference will be made, however, to a few pertinent publications which have a direct relationship to the subjects discussed in this paper. A great deal of work has been accomplished by numerous investigators who have attempted to show a positive association between mastitis and particular microorganisms.

Nocard and Mollereau, in 1887, incriminated the streptococci as the cause of mastitis.[14] Since that time *Streptococcus agalactiae* has received most attention by numerous workers. Reid[13] states that udder injury, poor herd management, and the highly infectious nature of *S. agalactiae* are the main causes of mastitis. Breazeale, *et al.*,[2] Brown and Bryan,[3] and Sweet, *et al.*,[16] represent a few of the investigators who have followed the procedure of streaking a sample of incubated milk on sodium azide agar or Edwards esculin agar. They have reported that streptococci, and in particular *S. agalactiae,* are predominate organisms found in large numbers of mastitic milk samples. Other investigators[6,14,18] reported that the coliform bacteria were the predominant microorganisms found in incubated mastitic milk streaked on beef infusion blood agar. In an investigation by Packer,[12] 76% of the mastitic milk samples submitted by practicing veterinarians were found to contain *M. pyogenes* var. *aureus* after incubation. In a study by Schlingman and Manning,[15] 410 mastitic milk samples were collected aseptically, diluted one to ten, and then seeded in a plate of rabbit blood agar. *M. pyogenes* var. *aureus* and *albus* were found in 63% of the cases.

†Present address is Department of Dairy and Food Industries, Iowa State College, Ames, Iowa.

Frayer[3] made a study of the milk from individual quarters of 100 infected cows in which both incubated and unincubated samples were centrifuged and then examined microscopically. Evidence of microorganisms was found in only four unincubated samples and in 98 incubated samples. No specific microorganisms were mentioned, but the author of the preceding reference concludes that all milk samples should be incubated in order to facilitate the microscopic detection of microorganisms. He further states that "Bryan's preservative (sodium azide, brilliant green dextrose, and water) or other inhibitors are highly desirable in eliminating any "contaminants" including the micrococci."

As compared with the extensive literature on the bacteriology of mastitic milk, there are relatively few references on the bacterial flora of the milk from "normal" udders. Since 1890 it has been generally accepted that milk drawn aseptically from udders regarded as "normal" is seldom sterile.[4] Copeland and Olson[6] reported that predominant types of organisms in milk from "normal" udders were micrococci. Dupont[7] also reported that *M. pyogenes* var. *aureus* and *albus* were major species in "normal milk."

Methods

During the period from October 1955, to May 1956, a total of 97 mastitic milk samples were submitted by practicing veterinarians for bacteriological examination. The procedure followed in collection of milk samples was as follows: strip cup examination was made of the mammary secretion of each quarter prior to obtaining the sample for bacteriological examination. Teats were disinfected with a 1:1000 solution of benzalkonium chloride (Roccal—Winthrop). Approximately 20 ml. milk from each infected quarter was collected in sterile, screw-cap (110 mm. x 15 mm.) tubes. All tubes were held as nearly horizontal as possible during collection to avoid contamination. Samples were packed in iced insulated containers and shipped by mail to the laboratory.

Ninety-seven milk samples were collected from the dairy herd at the North Dakota Agricultural College during April and May of 1956. According to information available, no cows had been previously infected with mastitis, nor had intramammary sulfa drugs or antibiotics been administered. The procedure followed in obtaining samples was the same as that used in the collection of the mastitic milk. Samples were taken immediately to the laboratory for examination.

The bacteriological procedure followed in examining mastitic milk and milk from normal udders was the same. After shaking each sample sufficiently to mix its contents, 5 ml. of milk were removed from each tube by means of a sterile pipette, and placed in a sterile, stoppered, centrifuge tube. All 5 ml. samples were centrifuged for 20 minutes at RCF = 6800 xG, in a Servall angle head centrifuge which was operated in a refrigerator with a temperature of 40 F. Streaks were made on tryptose blood agar plates from both fat layer and sediment. Plates were incubated for 24 hours at 37 C. All organisms were classified according to Bergey's Manual (1948).

At the end of the incubation period, bacterial colonies were observed macroscopically for morphological, hemolytic, and pigmentation characteristics. Transfers were made from the different types of colonies into tubes of brain heart infusion

TABLE 1. Distribution of Microorganisms from Mastitic Milk

Microbial Isolations	Percentage distribution
Micrococcus	62
Streptococcus	14
Escherichia and Aerobacter	10
Proteus	4
Diplococcus	2
Corynebacterium	2
Bacillus subtilis	2
Klebsiella	1

TABLE 2. Distribution of Microorganisms Isolated from Milk of "Normal Udders"

Microorganisms isolated	% distribution
Micrococcus	76
Escherichia and Aerobacter	9
Corynebacterium	4
Streptococcus agalactiae	3
Gaffkya tetragena	3
Bacillus subtilis	3
Sarcina lutea	2
Proteus mirabilis	1

broth and incubated for 24 hours. Portions of this broth inoculum were used for identification of the bacteria and for classifying micrococci for potential pathogenic properties based on coagulase production and fermentation of mannitol salt agar. Each of these cultures was then lyophilized and stored in a freezer for later investigations.

Results

Microorganisms Isolated From Mastitic Milk. One hundred isolations were identified and lyophilized from the 97 mastitic milk samples. No microbial growth was found in eight of the samples after centrifugation; however, one of these revealed growth after incubation. The species of microorganism isolated in this one case was *Escherichia coli.*

Eleven samples which exhibited growth were also found to have more than one type of organism present based on routine laboratory procedures.

Most microorganisms isolated from mastitic milk were of the genus Micrococcus. Of 100 isolations, 62 were micrococci, 14 streptococci, and ten coliforms. Relative percentages of the various microorganisms found are presented in table 1.

Of the Micrococci, 58% were *M. pyogenes* var. *albus,* 29% were *M. pyogenes* var. *aureus* and the remaining 13% belonged to several other species.

Production of coagulase and the fermentation of mannitol salt agar are commonly accepted methods of classifying micrococci according to pathogenicity.[10] Results of this investigation indicate that 89% of the *M. pyogenes* var. *aureus* and 69% of the *M. pyogenes* var. *albus* produced coagulase and fermented mannitol salt agar.

Alpha and beta hemolytic micrococci are generally regarded potentially more pathogenic than gamma hemolytic micrococci. The relationship of the hemolytic type to coagulase production and fermentation of mannitol salt agar are shown in tables 3 and 4.

Of 14 isolations of the genus Streptococcus, only four were *S. agalactiae;* the remainder of the streptococci belonged to several other species. In a preliminary experiment in which mastitic milk was centrifuged and then streaked, *Escherichia coli* was isolated from only three of 20 samples. However, when duplicate halves of these samples were incubated for 18 hours at 37 C. and then streaked, seven out of the 20 samples were found to contain coliforms. In most cases coliform colonies were predominant.

Isolation and Identification of Microorganisms from "Normal" Udders. In this phase of the work, all 97 samples of milk revealed growth when centrifuged and sediment was streaked on blood agar. Several samples were found to contain more than one type of organism.

The total number of separate isolations was 104. Of these, 76% were of the genus Micrococcus, and the remainder belonged to various families, genera, and species. Table 2 lists the relative distribution of the organisms found.

Of the micrococci, 63% were *M. Pyogenes* var. *albus;* 20% were *M. pyogenes* var. *aureus,* and the remaining 17% were micrococci of other species. The relationship of the hemolytic type to coagulase production and fermentation of mannitol salt agar is presented in tables 3 and 4.

Discussion

The results of this investigation indicate that 62% of the isolations from mastitic milk were of the genus Micrococcus (table

TABLE 3. Differential Characteristics of *M. pyogenes* var. *aureus* Isolated from Mastitic and Non-mastitic Milk

Type of hemolysis	% hemolytic types isolations		% producing coagulase		% fermenting mannitol	
	mastitic	non-mastitic	mastitic	non-mastitic	mastitic	non-mastitic
Alpha	0	0	0	0	0	0
Beta	72	44	100	71	100	86
Gamma	28	54	60	11	80	55

1). More specifically, 52% of the micrococci were *M. pyogenes* var. *albus* and 29% were *M. pyogenes* var. *aureus*. Similar observations were made by other investigators,[12,5,1] when mastitic milk samples were incubated before being streaked on blood agar. However, the predominant organism isolated by these workers was *M. pyogenes* var. *aureus*.

The potential pathogenic properties of the micrococci were determined on the basis of coagulase production, fermentation of mannitol and the type of hemolysis. In this investigation 89% of the mastitic isolates of *M. pyogenes* var. *aureus* and 69% of the mastitic isolates of *M. pyogenes* var. *albus* were classified as potential pathogens. These results are in close agreement with the generally accepted belief that *M. pyogenes* var. *aureus* strains are potentially more pathogenic than are *M. pyogenes* var. *albus*. These results agree with the common belief that pathogenicity is more closely related to beta hemolysis than to gamma hemolysis. A comparison of the type of hemolysis to coagulase production and fermentation of mannitol gave similar results for *M. pyogenes* var. *albus*.

The streptococci, which are usually incriminated as the cause of mastitis, were isolated from only 14% of centrifuged mastitic milk samples (table 1). Other investigators,[2,16,8] have reported that streptococci, and in particular *S. agalactiae* are the predominant organisms isolated from incubated mastitic milk.

Coliform bacteria represented 10% of unincubated, centrifuged samples examined in this study (table 1). Previous investigations[6,14,13] found the coliforms to be the predominant microorganisms in incubated mastitic milk. These results tend to indicate incubation might have a pronounced effect on the predominant microbial isolates found.

Micrococci were also the most prevalent microorganisms isolated from udders exhibiting no mastitic symptoms (table 2); 76% of the isolations were classified as micrococci, and of this total 63% were *M. pyogenes* var. *albus* and 20% were *M. pyogenes* var. *aureus*. These results are in accord with other investigators.[6,7]

Also, it has been demonstrated that the beta hemolytic isolations of micrococci from "normal" udders have a greater tendency to produce coagulase and ferment mannitol than do the gamma hemolytic types (tables 3 and 4).

However, in determining the ability of isolations from normal udders to produce coagulase and ferment mannitol, it was found that 31% of the *M. pyogenes* var. *aureus* isolations gave positive results. This is compared with the 89% of the mastitic isolations of *M. pyogenes* var. *aureus* which yielded positive results for these pathogenicity tests. This study has thus demonstrated that a much larger percent of *M. pyogenes* var. *aureus* isolated from mastitic udders reveal characteristics of potential pathogens than those found in "normal" udders.

A contrast to these results was presented by the *M. pyogenes* var. *albus* isolated from the two types of milk samples. It was found that 68% of the non-mastitic isolations and 69% of the mastitic isolations of *M. pyogenes* var. *albus* produced coagulase and fermented mannitol. A comparison of these results thus reveals that the same degree of potential pathogenicity was observed for *M. pyogenes* var. *albus* regardless of their origin.

Coliforms were the second most predominant type of isolations from non-mastitic milk. They represented 9% of the organisms which were isolated and identified, whereas

TABLE 4. Differential Characteristics of *M. pyogenes* var. *albus* Isolated from Mastitic and Non-mastitic Milk

Type of hemolysis	% hemolytic types isolations		% producing coagulase		% fermenting mannitol	
	mastitic	non-mastitic	mastitic	non-mastitic	mastitic	non-mastitic
Alpha	9	0	33	0	100	0
Beta	57	67	95	88	100	91
Gamma	34	33	33	35	67	76

S. agalactiae represented 3%. The remainder of the microorganisms isolated from milk of non-mastitic udders were representatives of a wide variety of genera. This was also found to be true for the mastitic isolations.

Results of a preliminary study indicated that incubation of a mastitic milk sample may reveal a predominant flora quite different from a milk sample centrifuged and its sediment plated immediately. In this investigation duplicate halves of 20 milk samples were centrifuged and incubated. It was found that *E. coli* was the predominant organism isolated from seven of the 20 incubated samples and from three of the 20 centrifuged samples. These data indicate that different organisms might be isolated when dissimilar methods of isolation are used.

From these results it appears that incubation of milk samples may permit rapidly growing microbes (*e.g. E. coli*) to predominate, whereas other slower growing microorganisms may dominate in the unincubated sample. Perhaps use of the incubation procedure, which has long been recognized as the accepted method in isolating mastitic microorganisms, explains why certain species of microorganisms have been found to predominate in mastitic milk. This reasoning is in agreement with Van Neil[11] who states that the organisms present under natural conditions are often different from those isolated under laboratory conditions. Although it is not known whether predominant organisms isolated are the causes of mastitis, it is believed that methods of isolation other than incubation will reveal more accurate information on organisms predominant in mastitic milk. Use of inhibitory media is also to be criticized for similar reasons. By permitting only certain microorganisms to grow and inhibiting all others, a true evaluation can not be made of predominant organisms as they are found in mastitic udders.

Present studies have indicated that centrifugation of milk samples followed by streaking of sediment on tryptose blood agar is a method whereby considerable error can be avoided in isolating and identifying predominant microorganisms. Further study of isolation of microbial flora from mastitic udders would be of definite value in conquering this disease.

Summary

The predominant organism isolated from milk samples of glands exhibiting clinical mastitis and from milk samples collected from glands neither exhibiting nor having a history of clinical mastitis is of the Micrococcus (Staphlococci) group.

Most quarters of all udders consistantly contain various potential mastitis producing organisms.

Various methods for isolation of organisms from milk samples may in a large measure account for disagreement on presence and types of organisms associated with mastitis.

Acknowledgements

The authors are grateful to the following practicing veterinarians whose cooperation provided pertinent case histories and milk samples: Drs. G. A. Larson, and J. F. Larson, Breckenridge, Minnesota; Drs. L. G. Best, and R. Meisner, Wahpeton, North Dakota; Dr. G. R. Lyons, Pelican Rapids, Minnesota; Dr. C. E. Fuller, Hawley, Minnesota; Benzalkoniun chloride (Roccal) for this investigation was supplied by Winthrop Sterns and Company. This report is published with the approval of the Director of the North Dakota Agricultural Experiment Station, and is based on a thesis submitted by K. L. Krabbenhoft in partial fulfillment of the requirements for the degree of Master of Science, North Dakota College of Agriculture. Studies were made possible in part by grants from Chas. Pfizer & Co., and Merck, Sharp and Dohme, Inc.

REFERENCES

1. Barnes, L. E., Oxytetracycline in Bovine Mastitis. *Am. Jour. Vet. Res.*, 16:386, 1955.
2. Breazeale, D. F., Kelly, P. L., Bartle, E., Hoerlein, A. B., and Harshfield, O. S., Bovine Mastitis: Treatment with Penicillin and Herd Practices Which Aid in Its Control. So. Dak. Agri. Exp. Sta., Bul. 392, 1948.
3. Brown, R., and Bryan, C. S., Six Months of Daily Mastitis Testing of An Infected and A Non-Infected Cow. Mich. Agri. Exp. Sta., Quar. Bul. 32, no. 3, 322, 1950.
4. Burrows, W., Textbook of Microbiology. The W. B. Saunders Co., Philadelphia and London, 16th ed., 1954.
5. Chute, H. L., Witter, J. F., and Rountree, J. L., Bovine Mastitis: Pathogenicity Testing of Micrococci. *Vet. Med.*, 49:419, 1954.

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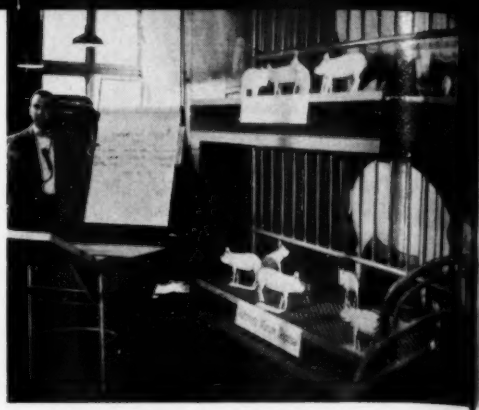
Dr. W. E. Boucher, Griswald, Iowa, presents plain facts of practitioner dispensing. Shown here with representative samples of his privately labeled dispensing products, Doctor Boucher points out that professional judgment is the dividing line between sound dispensing and sales promotion. For example his prescirption fly spray is changed several times during the season to avoid drug resistance and to maintain a high level of fly killing efficiency. This type of service can not be purchased over the counter.



Dr. J. Marcus Haggard, Delphi, Indiana demonstrates latest developments in push button pork production. Experimental unit provides air conditioning and automatic feed and water supply. Practitioners were urged to familiarize themselves with all phases of large scale swine raising as preparation for their new role of consultants to the increasing number of large scale swine projects.

Practice Tips By Closed Circuit T.V.

University of Missouri Shortcourse

Feature Supplies New Ideas

Useful in Every Practice

Dr. H. W. Howell, University of Missouri, demonstrates the convenience and advantages of ovariectomy in the cat by the flank incision.

Dr. R. E. Schmoll, Hamilton, Missouri, demonstrates the use of new rapid acting "Australian type" sheep drenching equipment. A rubber ball affords accurate trouble free administration from an easily cleaned rubber bag on his back.

FOR THE PAST SEVERAL YEARS the Missouri Conference for Graduate Veterinarians has opened with a popular early morning closed circuit telecast of practical tips and pointers useful in every practice. Planned and coordinated by Director of Clinics, Dr. Ed Ebert, and the veterinary faculty and students, this year's presentation attracted a full auditorium of practitioners to open the 34th Annual Conference, October 6 and 7, at Columbia, Missouri.

This television program from the veterinary clinic is the opening section of a well balanced professional speaking program which attracts veterinarians from the entire Midwest.

Practical Subjects

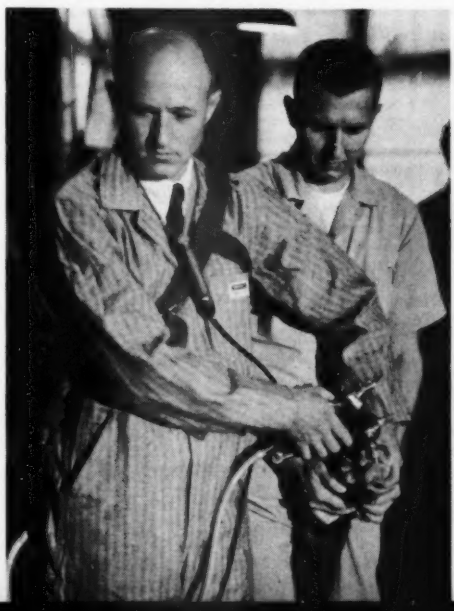
Other practical subjects not illustrated but equally interesting included a convenient method of securing the rumen following correction of a displaced abomasum. The presentation was made Dr. J. T. McGinity. Sow physiology for routine clinical procedures was discussed by Doctor Farmer. Convenient procedures for intestinal anastomosis in swine or other species over a gelatin capsule were demonstrated by Dr. Dave English. Dr. W. E. Newberry demonstrated a new tong like instrument for bovine castration which in one motion made an incision on the median raphia. This quick, simple technic exposes both testicles properly for effective emasculation.

Dr. K. H. Niemeyer reduced a feline fracture case and returned latter in the show to review x-ray plates of the leg with the expanding Jonas intramedulary pin in place. Dr. D. W. Baker demonstrated his technic for passing the catheter in the bitch. A special self illuminated speculum made the job sufficiently convenient for routine use in practice.

The success that the Missouri Conference for Veterinarians has enjoyed during the past several years has prompted continuing plans for even better sessions in the future. The veterinarian's need for new information and newer and better technics promises to grow. Practical presentation of such information and technics can best be accomlished in meetings such as the one at Missouri.

Dr. H. P. Callaway, Waverly, Missouri, demonstrates his multiple offense on swine. In one smooth operation he administers hog cholera antiserum intraperitoneally, injects hog cholera and erysipelas vaccine and castrates by a one hand method. From a special apron, insect repellant is sprayed on the surgical site from a pressurized bomb. This procedure allows him to properly handle several hundred pigs an hour and constitutes major saving of labor for his clients.

Dr. A. W. Doughty, Pinckneyville, Illinois, discusses efficient utilization of the Medical Coach practice truck and pointed out several convenient storage technics for instruments and drugs. He is shown here administering four boluses to a calf at once with a special long head balling gun. This technic permits rapid administration of anthelmintics during routine handling for pellet implantation.



Antibiotic Stimulation of Milk Production

A. B. CHRISTIAN, D.V.M.

Biltmore, North Carolina

CHLORTETRACYCLINE (Aureomycin—American Cyanamid) has been used for several years in the promotion of more rapid rates of gain, improvement of feed conversion, and elimination of subclinical infection in beef cattle. Although it has proved to be effective in the control of bacterial diarrheas in dairy calves and, by controlling infection, has improved their rate of gain, chlortetracycline has not been extensively investigated for use in adult, lactating dairy cattle.

Individuals who did preliminary work with chlortetracycline in the ration of lactating dairy cattle reported that the level 0.1 mg. per pound of body weight had no adverse effect of feed consumption or milk production when fed for a period of two weeks.[3,1] This level corresponds to the amount routinely fed to beef cattle. Henderson, et al.[1] demonstrated no assayable antibiotic inthe milk from cows fed this level. Loosli and Warner[3] demonstrated that feeding five times the above level had no effect on the cheese starter activity of milk.

Beef cattle on feeds containing chlortetracycline have gained weight at a more rapid rate than cattle not fed feeds containing the antibiotic. This effect results from the control of subclinical disease. Therefore, the possibility of increasing milk production in dairy cattle by controlling subclinical disease or other mechanisms was considered.

Materials and Methods

A total of 60 Jersey cows was included in this investigation. There were 29 cows in the first of two concurrent experiments; 14 received chlortetracycline and 15 served as controls. In the second experiment 31 cows were used; 16 received the same antibiotic; 15 served as controls. The antibiotic fed cows received the chlortetracycline in an alfalfa meal carrier which contained 2.0 gm. per pound. This was mixed in the standard dairy ration twice daily in amounts sufficient to provide an intake of 0.1 mg. of the antibiotic per pound body weight daily (80 to 90 mg.). The cows were selected at random and placed in each treatment group. Milk production records were obtained for all cows every third day for a period of 118 days in the first experiment and for a period of 126 days in the second experiment. Records concerning the incidence of disease in all cattle were also maintained.

TABLE 1

	Experiment 1		Experiment 2	
	Control	Aureomycin	Control	Aueromycin
Average number of previous lactations	4.2	4.7	4.3	3.8
Stage of current lactation at start of experiment, months	3.7	3.4	5.3	5.6
Average daily production per cow for 30 days before start of experiment, lb.	27.1	28.0	24.2	24.8
Difference, lb.		.9		.6
Percent		3.3%		2.5%
Average daily production per cow, for final 30 days of experiment, lb.	19.5	21.3	20.4	23.7
Difference, lb.		1.8		3.3
Percent		9.2%		16.2%
Increase in difference between groups, Percent		5.9%		13.7%

Results and Discussion

Milk production records as presented in figures 1 and 2 illustrate that cows which received chlortetracycline increased their milk production over controls. This difference was maintained even after late March, when the cows were turned on pasture.

The slight differences in production which were observed at the start of the experiment, as outlined in table 1 (3.3% and 2.5%), were considered within the range of normal variation. However, it may be observed from this table that the differences between groups were increased. For a comparable period (30 days) near the end of the experiments the antibiotic-fed cattle showed increases inproduction of 5.9 and 13.7% in experiments 1 and 2 respectively. No effect on the fat content of milk was observed in comparisons between control and treated cows. There was no effect on the fat percentage of milk from treated cows compared with the fat percentage of milk from those same cows during lactation the same months of the previous year. However, an increase in total milk production would mean an increase in total fat production since the percentage of fat was constant.

Incidence of disease was low and the differences between treated and control groups were not significant. Although cattle for control and treatment groups were selected at random, lifetime production records of cows were examined to determine whether similar cows were used in each group. Cows with a history of varying numbers of previous lactations and stages of the current lactation were present within each group. Production per cow also varied within each group. Table 1 shows that there was little difference between groups in each experiment with respect to number of previous lactations or the stage of the current lactation. In addition, average daily production per cow for 30 days immediately prior to the beginning of each experiment was found to be similar for each group.

Statistical determination of the mean and mode was made on the above factors. It was determined that there were no individual values within each group which would unduly weight the averages presented.

Summary

Experiments were conducted with two herds of Jersey cows. Approximately half of the cows in each herd received chlortetra-

FIGURE 1

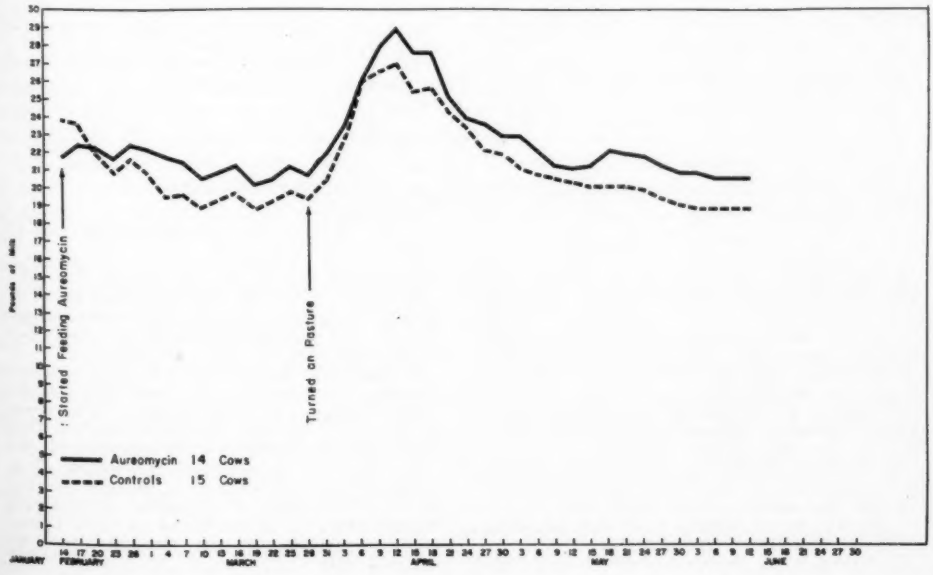
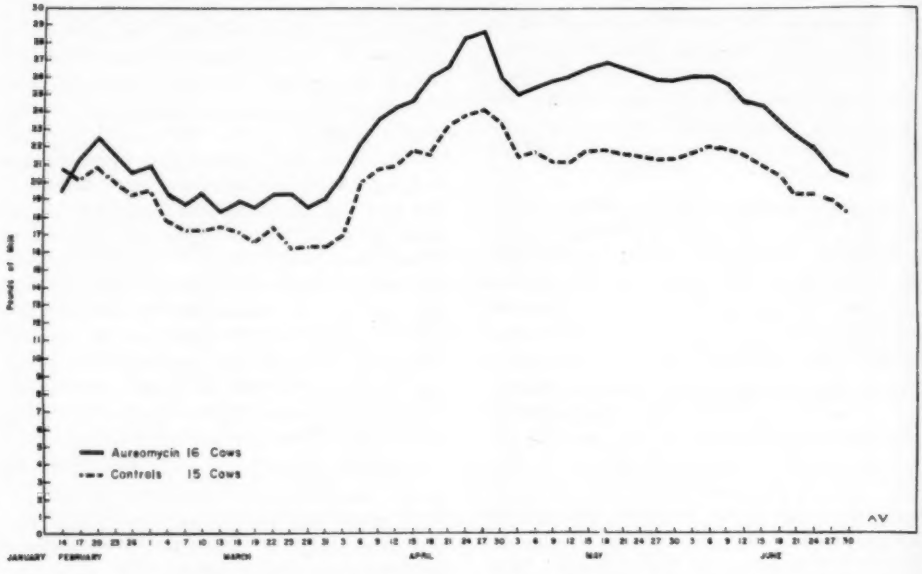


FIGURE 2



cycline in the feed at a level of 0.1 mg. per pound of body weight for 118 and 126 days respectively. Milk production in one herd was increased 5.9%; in a second herd production was increased 13.7%. This increase in production was observed both while cows were in barns and after they had been turned out on pasture. No effect on fat percentage was calculated, although the total fat yield was increased.

No evidence of deleterious effects occasioned by the use of Aureomycin were noted. No difference in the incidence of disease was observed, but overall incidence of clinical disease was low.

REFERENCES

1. Henderson, B. W. Jr., Cobble, J. W., and Easterbrooks, H. L., The Recovery of Milk and Blood Levels of Aureomycin When Fed to Lacating Dairy Cows. *Jour. Dairy Science*, 50:617, 1957.
2. Loosli, J. K., and Warner, R. G., Antibiotics for Dairy Animals. *Farm Research*, 18:3, 1952.
3. Shor, A. L., Johnson, W. P., and Abbey, A., to be published.

BACTERIOLOGICAL DIFFERENTIATION . . .

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6. Copeland, L., and Olson, T. M., The Bacterial Flora of Normal Cows' Udders. So. Dak. Agri. Exp. Sta. Bul. 218, 1926.
7. Dupont, M. C., Bacteriological Studies of Milk: Abnormal Flora of the Udder. Vet. Bul., 2, 6, 1931.
8. Ferguson, J., The Bacteriology of Acute Mastitis. *Cornell Vet.*, 30:299, 1940.
9. Frayer, J. M., A Study of Certain Methods Used In The Laboratory Diagnosis of Bovine Mastitis. Univ. Vt. Agri. Exp. Sta. Bul. 547, 1948.
10. McCullock, E. C., The Resistance of Chronic Staphylococci Bovine Mastitis to Massive Penicillin Therapy. *Am. Jour. Vet. Res.*, 8:173, 1947.
11. Neil, C. B. van., Natural Selection in the Microbial World. *Jour. Gen. Microbiol.* 13:201, 1955.
12. Packer, R. A., Incidence of the Various Mastitis Organisms in Iowa. *N. Am. Vet.*, 28:591, 1947.
13. Reid, J. J., Bovine Mastitis I: A Study of the Relative Incidence of Microorganisms Associated with Mastitis in Pennsylvania Dairy Herds. Penn. State College Agri. Exp. Sta. Tech. Bul. 525, 1950.
14. Schalm, O. W., and Woods, G. M., The Mastitis Complex. *Jour. Am. Vet. Med. Assn.*, 122:462, 1953.
15. Schlingman, A. S., and Manning, M. C., Griseovirdin and Viridogrisen: New Antibiotics for Treatment of Bovine Mastitis. *N. Am. Vet.*, 37:561, 1956.
16. Sweet, W. W., Burkey, L. A., Buchner, C. R., Underwood, P. C., Mathews, C. A., and Fohrman, M. H., Effectiveness of Penicillin in Eliminating Mastitis Infections in the Bureau of Dairy Industry Herd. U. S. Dept. Agri. Bur. Dairy Ind. Tech. Bul. no. 1027, 1950.

The writers report on visceral lymphomatosis in two turkey flocks characterized by tumors in liver, kidney, spleen and intestine in some birds, as well as pancreas, testicles, lungs and cardiac tissue in others. All neoplastic tissue was composed of lymphoblastic-like cells, many of which were in some stage of mitosis.

The Avian Leukosis Complex

A Review of Recent Literature and a Report of Visceral Lymphomatosis in Two Turkey Flocks

PAUL M. NEWBERNE, D.V.M. and CHARLES J. VOSBRINK, D.V.M.

School of Veterinary Medicine
University of Missouri
Columbia, Missouri

THE avian leukosis complex has become one of the most important disease problems affecting the poultry industry. Following the early systematic studies on avian leukosis by Ellermann at the beginning of the present century, many reports have appeared in the literature relative to the disease complex in the aves. Most of these reports have dealt with the problem in chickens. Leukosis has been reported in a parakeet[37] and in at least five instances in turkeys.[19,29,30,38,41] The small number of reports of the occurrence of leukosis in species other than chickens may have resulted from the general concept among poultry pathologists that leukosis is a disease normally limited to chickens. It is likely that leukosis has been overlooked as a possibility in other species where lesions were not specific and where histological studies were not made.

During the past five years over 125 reports of a technical nature concerning leukosis have been published. This paper discusses some of the more recent important studies and reports the occurrence of visceral lymphomatosis in two flocks of turkeys. More complete information on leukosis is available in the reviews by Jungherr[28] and the United States Department of Agriculture.[42]

Table 1 lists the various forms of the avian leukosis complex and gives the common name for each form. Although previously considered to be caused by a single agent, most recent evidence suggests that each form of the complex may have its own causative agent.

Incidence

The USDA[41] estimates that leukosis causes an annual loss of $75,000,000. to the poultry industry. The increasing incidence of the disease is attributed to modern technics of mass production, such as forced draft incubators, mass brooding, and interstate shipment of chicks.

Doctor Newberne's present address: Dept. of Nutrition, Alabama Polytechnic Institute, Auburn, Ala.

TABLE 1. The Avian Leukosis Complex

Scientific Names	Common Names
1. Lymphomatosis	
a. Visceral lymphomatosis, lymphocytoma	Big liver disease
b. Neural lymphomatosis, Marek's paralysis	Fowl paralysis, Range paralysis
c. Ocular lymphomatosis, iritis	Gray eye disease
d. Osteopetrotic lymphomatosis, osteopetrosis	Big bone disease, marble bone
2. Leukosis	
a. Erythroblastosis, erythroleukosis	Fowl leukemia, blood disease
b. Granuloblastosis, myeloblastosis	Fowl leukemia, blood disease
c. Myelocytomatosis, leukochloroma	White tumors

Coles[18] estimated the annual loss to the British poultry industry to be about £30,000,000. British government laboratories[2] reported that about 24% of the birds presented for autopsy had died of leukosis.

Savage and Isa,[39] at the Prairie Laboratory in Canada, report that 11.1% of birds presented for autopsy were infected with leukosis. In this study leukosis was second only to coccidiosis in importance. It appears that neural lymphomatosis is responsible for the most early losses, whereas visceral lymphomatosis is responsible for most of the losses later in life.[2,35] Other forms of leukosis are relatively rare. In flocks with a high incidence of coccidiosis and other intestinal parasites some workers[22,17] have observed a higher incidence of leukosis. Nightall[34] found less leukosis in flocks using the battery system than in those using other types of management.

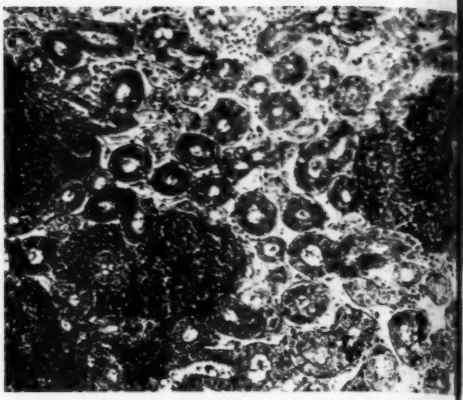
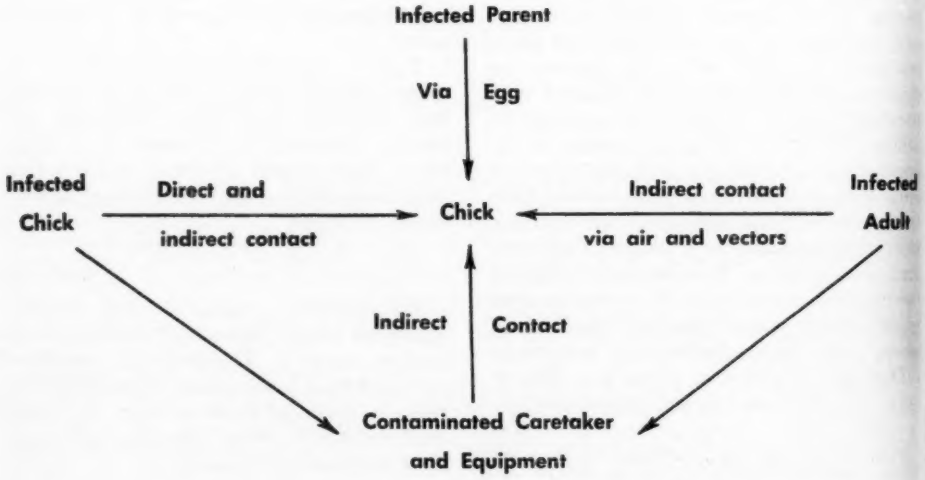


Fig. 1. Focal infiltration of kidney by lymphoid masses. H and E stain x 120.

Detection of Infected Birds

Mommaerts *et. al.*[33] reported that concentrates of the virus of myeloblastosis had a great capacity for dephosphorylation of

TRANSMISSION OF FOWL LEUKOSIS



adenosine triphosphate. Later experiments[1] confirmed that the enzyme was intimately related to the virus particle. A test was developed[22,23] to detect birds which were infected with myeloblastosis through the detection of the enzyme which dephosphorylated adenosine triphosphate in the blood of infected birds. The quantity of enzyme in the blood is correlated with the level of infection. The blood of normal birds does not contain the enzyme. Lesher and Burmester[30] found the test effective in detecting birds infected with visceral lymphomatosis. They were able to detect 40 out of 42 infected birds and had no positive reactions in the 300 control birds.

Transmission

Transmission has been the most disputed point in the study of the avian leukosis complex. Carr[31] believed blood sucking parasites important in transmitting the disease, whereas Hutt and Cole[25] considered them unimportant and suggested that Carr was referring to the Rous sarcoma.

Experiments by Gentry and Burmester[21] showed that the virus of visceral lymphomatosis would grow in the embryonating egg. It had previously been proven[16] that the virus could be transmitted through the egg by apparently normal chickens. As birds grow older, the amount of virus passed in the eggs seems to be reduced.[5] Infected chicks may infect other chicks during the brooding period;[6] however, after the first 60 days of life infection seldom occurs.[7]

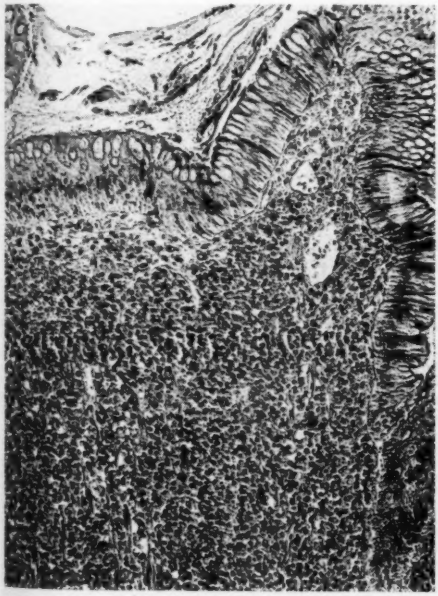


Fig. 2. Duodenum. Diffuse infiltration of lymphoid tissue into lamina propria obliterating mucosal glands. Mucous cells of surface epithelium increased. H and E stain x 120.

Burmester and Waters[6] believe that the importance of egg transmission is not in the direct transmission of the disease to progeny, but in the ability of few progeny to pass the infection on to other chicks during the brooding period. There is as yet no evidence that any form of avian leukosis, other than visceral lymphomatosis, is transmitted through the egg.

A number of investigators[8] have indicated that visceral lymphomatosis may be transmitted through Newcastle vaccine when embryonating chicken eggs are used in its production. The virus of visceral lymphomatosis may be present in saliva, feces, oral washings, and hatchery debris.[9] Mucous membranes of the chicken which are normally exposed to air, and particularly those of the respiratory tract, are highly susceptible to this virus.[10]

Immunization

Burmester[4] has shown that immunization is possible for visceral lymphomatosis. The method consists of injecting the hen with low concentrations of the virus on alternate days for one week. This is followed by injections containing ten times the original virus concentration on alternate days for three weeks. Ten days after the last injection of the three-week series a final injection is given containing a higher concentration of the virus.

Among chicks from immunized hens the incidence of the disease was 3 to 13%. Chicks from control hens had an incidence of 41 to 70% visceral lymphomatosis.

Use of Drugs

A number of workers have reported on the use of various drugs in treatment of leukosis. Results of some of these studies are summarized in table 2. None of the

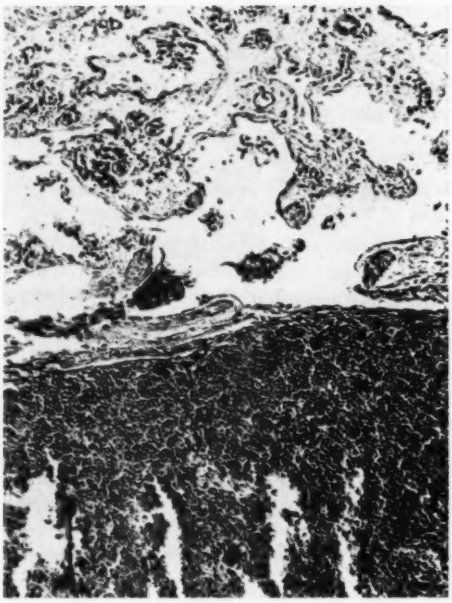


Fig. 3. Lung with large mass of lymphoid tissue. Lymphoblastic-like cells invading air passages and smaller vessels. H and E x 120.

drugs tried have offered any promise; however, the addition of vitamin A and cobalt in several trials indicated that improved diet may be an important factor in prevention and control of leukosis.

Breeding Resistance

Mortality caused by leukosis virus may be as high as 50% in an individual flock.[21] Three important factors determining mortality are: (1) Genetic resistance; (2) age at which birds are exposed, and (3) severity of exposure.

Bryant *et. al.*[3] were able to reduce mortality from 32.3% to 13% in five years through selection.

The more important points to remember with reference to breeding for resistance to leukosis include the following:

1. There is no relationship between fertility and resistance to leukosis.[26]

2. Resistance to one form of leukosis does not imply resistance to another form.[20]

3. Crossbreeding without considering the resistance of parents to leukosis does not decrease leukosis mortality.[18]

TABLE 2. Summary of Recent Experiments With Various Drugs

Drug	Method of Administration	Form of Leukosis Used	Results	Reference
A-methopterin } Aminopterin }	Oral	RPL-12*	No effect; suggested that they may not have been absorbed adequately.	Darcel, 1953
Cobalt	In feed—to provide each fowl with .25 mg.		In flocks in which the cobalt level in the liver was low the average incidence of fowl paralysis was reduced from 7.7% to 2.7% a year later following the addition of cobalt to the ration.	Sandstedt & Sjoberg, 1952
Krebiozen	Intramuscular	RPL-16	No effect.	Gentry, 1952
Nitrofurazone	Intraperitoneal In feed—at .1 % concentration	RPL strain } RPL strain }	Treated chicks developed tumors somewhat faster and died a little earlier from metastasizing tumors than the non-treated tumor inoculated controls.	Lannek, 1954
Triethylene } melamine }	Oral Parenteral	RPL-12 RPL-12	No effect. When given before appearance of palpable tumors, it had some inhibitory effect but was highly toxic. If treatment was delayed until tumor appeared there was no significant effect on survival time.	Darcel, 1953 Darcel, 1953
Vitamin A	Levels as high as 5,000 i.u./ lb. body weight		Appreciably reduced incidence; low level vitamin A diet resulted in 40% increase in leukosis; addition of condensed fish solubles to diet low in vitamin A increased occurrence of leukosis 100%.	Gordon, 1953

*RPL refers to strains of leukosis isolated at the United States Regional Poultry Research Laboratory, East Lansing, Mich.

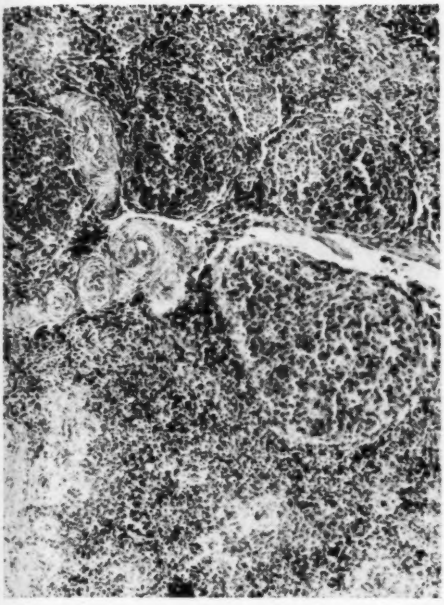


Fig. 4. Spleen with focal areas of lymphoid tissue and diffuse hemorrhage. H and E x 120.

Fig. 5. Focal lymphoid mass in liver compressing liver cord cells into concentric layers. H and E x 400.

4. Strains of chickens bred for resistance to a form of leukosis in one locality will remain resistant to the same form in another locality.[30]

5. Selection of desirable breeding hens is best done following the pullet year.[12]

6. There should be a source of infection present on the premises where breeding is toward resistance.[12,13,14] If all infected birds are removed the flock will have no exposure to the virus and the breeder will be unable to determine the resistance in his birds.

1. The Avian leukosis complex is one of the most important poultry diseases.

2. A test is being developed which will detect infected birds through the presence of the enzyme dephosphorylating adenosine triphosphate in the blood.

3. The visceral form of lymphomatosis has been proved to be egg transmitted and contact infection. It occurs principally during the brooding period. No evidence of egg transmission has been presented in regard to the other forms of leukosis.

4. Drugs have had no significant effect on the course of the disease complex.

5. It has been demonstrated that hens can be immunized so that their progeny will have a considerable degree of resistance during the brooding period, the most important time for contact infection. The method for immunizing has not been perfected at present to the point where it is practical for field use.

6. Breeding birds for resistance has been effective when proper procedures have been employed.

Visceral Lymphomatosis in Two Turkey Flocks

A flock of 500 eight month old Broad Breasted Bronze turkeys sustained a loss of 25 birds over a four week period. Symptoms were the same in all affected birds consisting of a gradual loss of appetite, progressive weight loss and diarrhea. No other concurrent disease was observed in the flock.

Another flock of 250 eleven month old Broad Breasted White turkeys experienced a loss of 21 birds over a period of six weeks. Losses began as the flock was coming into

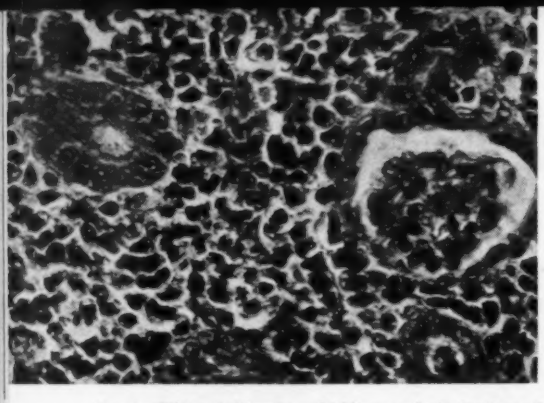


Fig. 6. Diffuse infiltration of kidney and elimination of tubular elements. H and E x 400.

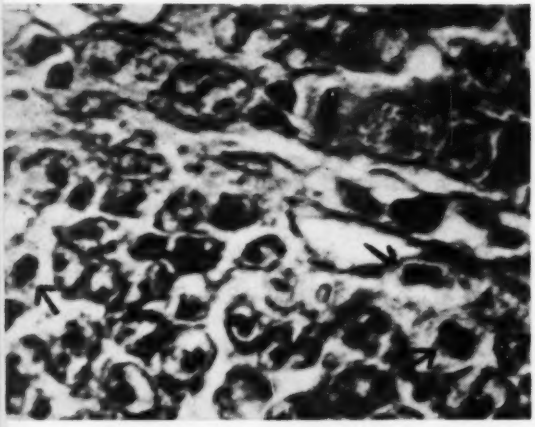


Fig. 7. Section from liver showing mitotic figures (arrows) in lymphoblastic-like cells of focal lymphoid mass. H and E x 1,000.

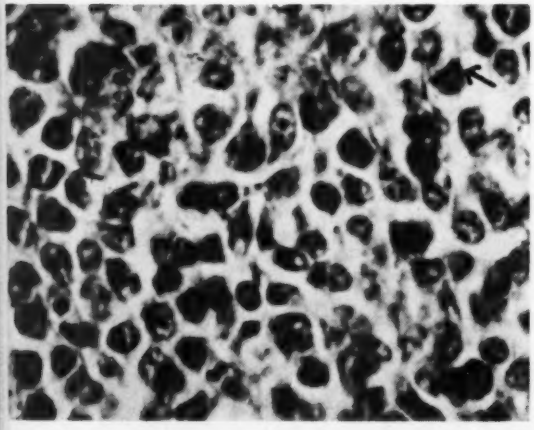


Fig. 8. Section from lymphoid mass in lung showing lymphoblactic-like cells in mitosis (arrows) H and E x 1,000.

production. Symptoms in this flock were the same as those described above. Careful examination failed to reveal the presence of any other disease in the flock.

Gross Lesions

Gross lesions were the same in both flocks. Degree of involvement of tissues varied among individual birds in each flock. Spleen was enlarged in every bird examined. Capsule was thickened and parenchyma studded with minute grayish areas occasionally interrupted by hemorrhagic foci. Cut surface showed small diffuse grayish areas and irregular pools of hemorrhage.

The liver was typically enlarged with a diffuse grayish background contrasted by red congested vessels. This pattern gave the organ the characteristic marblized appearance common to diffuse lymphomatosis in the chicken.

Kidneys were enlarged and presented a diffuse grayish appearance. The number of lobes affected varied from one to three and the enlargements were generally bilateral. Grossly visible lesions were not observed in the ovaries; however, the testicle of one tom was enlarged and contained a firm bulging mass at the anterior pole. Small grayish-white nodules were visible in the lung and pancreas. Thickening of the wall with long irregular masses occurred along the length of the intestines. In some areas the enlargement was annular so as to cause considerable reduction in the lumen. The remainder of the organs and tissues did not appear to be grossly affected.

Histopathology

Microscopically all lesions were composed of dense masses of lymphoid tissue, focal in some areas and diffuse in others. The lymphoid tissue was composed largely of lymphoblastic-like cells. The nucleus was large and contained a distinct nucleolus. There was a margination of chromatin and mitotic figures were abundant (fig. 7 and 8). The cells contained very little cytoplasm.

Dense islands of lymphoid tissue were numerous in the liver, varying in size from tiny aggregations to large foci which dis-

placed the liver cord cells into concentric layers surrounding the mass (fig. 5 and 7), and invaded surrounding tissue. Gross invasion of hepatic veins were seen in many sections (fig. 9).

The entire length of the small intestine was affected. All portions of the gut were infiltrated with dense lymphoid tissue which had destroyed most of the glands, particularly in the lamina propria (fig 2). In some areas mucosa was necrotic but more typically it was thickened and mucous cell activity greatly increased.

In kidney lymphoid tissue, both focal (fig. 1) and diffuse (fig 6) had invaded the interstitial tissue and destroyed tubular elements. Hemorrhage was present in many sections. Cloudy swelling and degeneration of tubular epithelium occurred in less severely infiltrated areas.

Focal infiltration and hemorrhage was consistently found in the spleen (fig 4). In some areas large masses of lymphoid tissue replaced from one-third to one-half of the splenic tissue.

Pancreas contained small focal areas of lymphoid tissue which disrupted normal architecture of the gland. Islets of Langerhans were present but reduced in size. Much of the acinar tissue was destroyed or displaced by the masses of invading lymphoid tissue, severely curtailing the functional capacity of the gland.

Large masses of lymphoid tissue were present in the lungs (fig. 3), obliterating large areas and frequently invading the larger air passages. Lymphoblastic-like cells were found invading some of the pulmonary vessels.

The myocardium was infiltrated diffusely with lymphoid cells sufficient to cause separation of fibers. No nodular foci were observed, however, which accounted for the lack of gross lesions in the heart.

The large firm mass found attached to a testicle was composed of lymphoid cells, densely packed with a few connective tissue fibers running throughout. A thin connective tissue capsule surrounded the periphery. The mass appeared to have originated as an extension of Neoplasia of the testicle which had ruptured through the tunic of the organ.

Fig. 9. Gross invasion of large hepatic vein by neoplastic tissue.

Summary

Visceral lymphomatosis is confirmed in two flocks of turkeys. Tumors were consistently observed in the liver, kidney, spleen and intestine. In other individuals pancreas, testicle, lung, and cardiac tissue were irregularly affected in addition. All neoplastic tissue was composed of lymphoblastic-like cells, many of which were in some stage of mitosis.

REFERENCES

1. Beard, J. W., The Virus of Avian Myeloblastic Leukosis. *Poul. Sci.*, 35:203, 1956.

2. Blaxland, J. D., The Practical Importance of Leucosis and Fowl Paralysis. *Vet. Rec.*, 68:528, 1956.

3. Bryant, R. L., Eveleth, D. F., Bolin, F. M., and Moreng, R. E., Reducing Leucosis through Selective Breeding. Bi-monthly Bul. N. Dak. Agric. Exp. Sta., 26:67, 1953.

4. Burmester, B. R., Immunity to Visceral Lymphomatosis in Chicks following Injection of Virus into Dams. Soc. Exp. Biol. and Med. Proc., 88:153, 1955.

5. Burmester, B. R., and Waters, N. F., Variation in the Presence of the Virus of Visceral Lymphomatosis in the Eggs of the Same Hens. *Poul. Sci.*, 35:939, 1956.

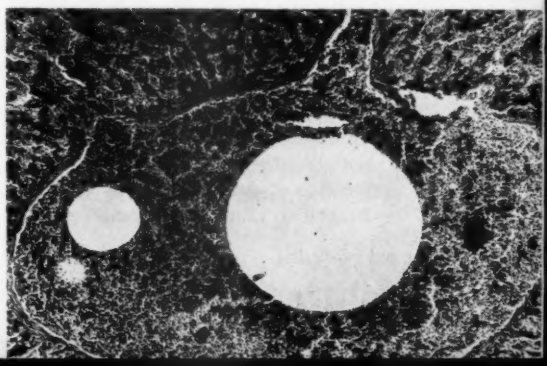
6. Burmester, B. R., and Waters, N. F., The Roles of the Infected Egg in the Transmission of Visceral Lymphomatosis. *Poul. Sci.*, 34:1415, 1955.

7. Burmester, B. R., and Gentry, F. R., A Study of Possible Avenues of Infection with the Virus of Avian Visceral Lymphomatosis. Proc. 91st An. Meeting of Am. Vet. Med. Assoc., 1954, pp. 311-317.

8. Burmester, B. R., Cunningham, C. H., Cottral, G. E., Belding, R. C., and Gentry, R. F., The Transmission of Visceral Lymphomatosis with Live Virus Newcastle Disease Vaccines. *Am. Jour. Vet. Res.*, 17:283, 1956.

9. Burmester, B. R., Shedding of the Virus of Visceral Lymphomatosis in the Saliva and Feces of Individual Normal and Lymphomatotic Chickens. *Poul. Sci.*, 35:1089, 1956.

10. Burmester, B. R., and Gentry, R. F., The Presence of the Virus Causing Visceral Lymphomatosis in the Secretions and Excretions of Chickens. *Poul. Sci.*, 33:836, 1954.



11. Carr, J. G., The Leukosis Complex. *Worlds Poultry Sci. Jour.*, 8:276, 1952.
12. Cole, R. K., and Hutt, F. B., Parents Age Unrelated to Leukosis in Progeny. *Poul. Sci.*, 35:720, 1956.
13. Coles, R., Lymphomatosis and the Breeders Problem. *Poul. Sci.*, 33:350, 1954.
14. Coles, R., Some Observations on Breeding Fowl Resistant to Lymphomatosis. *Poul. Sci.*, 34:312, 1955.
15. Coles, R., The Economic Significance of the Incidence of Mortality in Fowl. *Brit. Vet. Jour.*, 3:235, 1956.
16. Cottral, G. E., Burmester, B. R., and Waters, N. F., Egg Transmission of Avian Lymphomatosis. *Poul. Sci.*, 33:1174, 1954.
17. Darcel, C. Le Q., Lancaster, J. E., and Gordon, R. F., Observations on the Mortality in Poultry with Special Reference to the Incidence of Leukosis. *Brit. Vet. Jour.*, 108:338, 1952.
18. Darcel, C. Le Q., Observations on the Effect of Triethylene Melamine, Aurenopterin and A-Methopterin on the Growth of Transplantable Avian Lymphoid Tumors. *Brit. Jour. Pharm.*, 8:278, 1953.
19. Durant, A. J., Leukemia in Fowls. Mo. Agric. Exp. Sta. Bul. 295, 1930.
20. Eckert, E. A., Waters, N. F., Burmester, B. R., Beard, D., and Beard, J. W., Dose-Response Relations in Experimental Transmission of Avian Erythromyeloblastic Leukosis. IV. Strain Difference in Host-Response to the Virus. *Jour. Nat. Cancer Instit.*, 14:1067, 1954.
21. Gentry, R. F., and Burmester, B. R., The Propagation of the Virus of Visceral Lymphomatosis in Embryonating Eggs. *Poul. Sci.*, 34:669, 1955.
22. Gordon, R. F., The Incidence of the Avian Leukosis Complex in England and Wales. XV. Internat. Vet. Cong. Proc., Part I, vol. 2:1054, 1953.
23. Green, I., Beard, D., Eckert, E. A., and Beard, J. W., Quant. Aspects of Micro ATP'ase Measurements on Plasma from Chicks with Erythromyeloblastic Leukosis. Soc. Exp. Biol. and Med. Proc., 85:406, 1954.
24. Hutt, F. B., and Cole, R. K. 1953. The Interaction of Genetic and Environmental Influences Affecting the Incidence of Avian Leukosis. Science, 117:695-697.
25. Hutt, F. B., and Cole, R. K., On Fleas, Blood, and the Control of Leukosis. *Worlds Poul. Sci. Jour.*, 9:7, 1953.
26. Hutt, F. B., and Cole, R. K., Resistance to Lymphomatosis in the Fowl in Relation to Reproduction. *Nature*, 176:1178, 1955.
27. Järmai, K., Leukose und Sarkom beim Wellensittich. *Arch. f. wissensch. Prakt. Tierheilk.*, 74:316, 1939.
28. Jungherr, E., The Avian Leukosis Complex. Biester and Schwarte, Diseases of Poultry. 3rd. ed. Ames, Iowa. pp. 453-508.
29. King, D. F., Cole, R. K., Hutt, F. B., and Cottier, G. J., Tests in Different Environments of Fowls Genetically Resistant to Leukosis *Poul. Sci.*, 31:1027, 1952.
30. Lesher, S., and Burmester, B. R., Plasma Phosphatose Activities of Normal and Lymphomatous Chickens. *Cancer Res.*, 15:573, 1955.
31. Lannek, N., The Effect of Nitrofurazone on Experimental Lymphomatosis in Chicks. *Nord. Vet. Med.*, 6:693, 1954.
32. Mommaerts, E. B., Beard, D., Eckert, E. A., Sharp, D. G., and Beard, J. W., Dephosphorulation of Adenosine Triphosphate by Concentrates of the Virus of Avian Erythromyeloblastic Leukosis. Soc. Exp. Biol. and Med. Proc., 79:450, 1952.
33. Mommaerts, E. B., Beard, D., and Beard, J. W., Screening of Chicks with Erythromyeloblastic Leukosis for Plasma Activity in Dephosphorylation of Adenosine Triphosphate. Soc. Exp. Biol. and Med. Proc., 83:479, 1953.
34. Nightail, E. W., A Study of the Incidence of Lymphomatosis in Poultry kept at the Univ. of Nottingham School of Agric. *Poul. Sci.*, 35:109, 1956.
35. Pamukcu, A. M., and Baskaya, H., Leucosis Complex. I. Ankara da tavuklonda Görulen viseral lymphomatosis olaylari. *Vet. Bul.*, 23:3432, 1952.
36. Pollard, M., and Hale, W. J., Interspecies Transmission of Avian Leucosis in Embryos. *Am. Jour. Vet. Res.*, 3:247, 1942.
37. Prier, J. E., and Alberts, J. D., Turkey Diseases. Univ. of Illinois Agric. Exten. Circ., 654:17, 1950.
38. Sandstedt, H., and Sjpberg., Kort Meddelande betraffande forebyggande atgarder Med kobolt Mot leukos hos hons. *Nord. Vet. Med.*, 4:283, 1952.
39. Savage, A., and Isa, J. S., A Decade of Poultry Specimens in a Prairie Laboratory. XV International Vet. Cong. Proc. Part I, vol. 2:1073, 1953.
40. Simpson, Charles F., Anthony, D. W., and Young, Franklin. *Jour. Am. Vet. Med. Assn.*, 130:93, 1957.
41. U. S. Dept. of Agric. Lymphomatosis: Poultry's Worst Disease. Agr. Res., 2(12):4, 1954a.
42. U. S. Dept. of Agric. Lymphomatosis in Chickens. Circular 970, 1955.
43. Waters, N. F., Avian Lymphomatosis Mortality Among Inbred Line Crosses. Worlds Poul. Cong., 1954.

Humane Slaughter

Federal legislation on humane slaughter will not relax the meat industry's long and diligent search for improved methods of livestock processing, according to release from the American Meat Institute.

Continuing emphasis on its "long established policy of searching for improved methods of slaughtering" was voted by the joint committee of American Meat Institute and the American Humane Association during a Chicago meeting in mid-September.

Under terms of the Humane Slaughter Act, Secretary of Agriculture Benson is required to designate, by March 1, 1959, what slaughter-methods are considered "humane." These methods, it is expected, will be strongly influenced by an advisory committee of 12 to be appointed soon by the USDA. The act is scheduled to become effective on July 1, 1960.

Changing trends in livestock production have prompted almost universal adoption of practices such as castration, antibiotic feeding, and hormone implanting. Here the writer reviews controlled tests on hormones, and suggests continued use in livestock production.

Hormones in Livestock Production

A. D. RANKIN, D.V.M., M.S.

Associate Medical Director
The Squibb Institute
New Brunswick, New Jersey

TECHNOLOGICAL IMPROVEMENT in production of livestock has been rapid in the last 20 years. The veterinarian should be alert to the development of more efficient methods so that he may pass this information on to his clientele and thereby enable them to compete more successfully. The livestock industry is, of necessity, vitally interested in preventive medicine and in procedures, medicinal or other, for improving the efficiency of operation.

What are some of the procedures used?

Castration of bulls, which dates back to antiquity, is the oldest and most common practice for the improvement of livestock production. More recent is the caponization of cockerels to improve the quality of meat and hence the market value.

Genetic control is a procedure in which the poultry industry has made tremendous advances since 1900. The 12 month egg laying tests which first started in 1911 have been a stimulus in this direction. There are more birds today giving a first year production of 300 eggs than there were 200 egg a year birds 25 years ago. This 50% increase is a result of careful selection. There are enough 350 egg a year layers to indicate that the national average may be boosted even higher.

In the dairy industry we find national production records indicate that the average production has increased 100 lb. per cow per year for the last ten years. The average production per cow today is over 1,000 lb. of milk more than ten years ago. It is predicted that this rate of increased productivity will continue for at least another ten years. This has been due to greater use of the heavy producing breeds and to the use of artificial insemination to get more rapid dissemination of desirable qualities.

In the last few years the beef cattle industry has become aware that the economics of raising beef is not tied up in the several external characteristics used to judge animals but rests primarily in the ability to gain — both rapidly and economically. At present the emphasis of selection is on the rapidity of gain. The industry appears to be following the direction of the dairy industry and using artificial insemination to make best use of this inherited ability to gain.

Ration control is another procedure that is becoming increasingly important. The value of a balanced ration has long been known. The control of micro-ingredients is extremely important in the poultry industry. There is another approach that is becoming widespread through out the industry: the control of disease or the stimulation of growth by the addition of substances to the feed.

The use of high levels of vitamin A in the ration to reduce the incidence and severity of pulmonary disease is common feed lot practice.

The addition of antibiotics in low levels to the ration to increase rate of growth of poultry, pigs, and cattle is also common practice. It was first reported by Perry[1] that yearling steers receiving 75 mg. of Aureomycin per animal daily gained 43 lb. more than the controls. High antibiotic levels in feed have been employed to combat disease conditions. This provides mass medication without subjecting animals to the stress of individual handling.

The mechanism of growth stimulation due to low level feeding of antibiotics is unknown. There are several postulations: (a) reduction of subclinical infection, (b) improvement of assimilation in the intestinal tract, (c) reduced competition between the host and bacteria for essential nutrients.

The addition of diethylstilbesterol to the ration of steers at the level of 10 mg./hd./day was first reported in 1954 by Burroughs.[2] Hale[3] reported its value in lambs at the level of 2 mg./hd./day. Since it was first reported, the use of this feed additive has become very widespread throughout the country. There is a growing body of evidence that the beneficial affect is not as long lasting as first reports indicated. It would now appear that after 60 days of feeding it might as well be withdrawn from the ration. The feeder has his choice of when he wishes to feed it — either the first or the last period in the feed lot. The mechanism of action of diethylstilbesterol in the feed is still unexplained. Some reports indicate that it may be a local action in the rumen and intestinal tract, others indicate that the action may be systemic.

Other Procedures

On the horizon there appear reports on the use of anti-thyroid drugs to stimulate rate of gain. These reports are at present contradictory and we will have to wait for more experimental evidence before approving the procedure.

There are also reports[4] on the use of drugs in the tranquilizer class but at levels that are far below the level necessary to produce tranquilization. Here again it would appear that confirmatory evidence is desirable.

TABLE 1

	Control	Synovex-S	Diethylstilbesterol 24 mg.
Number of head	20	69	69
Average in-weight	554	545	541
Average out-weight	837	919	861
Average daily gain lb.	2.32	2.85	2.53
Feed consumption lb./day	25.01	28.21	26.29
Feed cost/day in cents	52.52	58.45	54.55
Feed conversion ratio	10.78	9.90	10.41
Cost per lb. of gain	22.63	20.51	21.60
Average selling price/cwt.	20.00	20.65	20.54
Gross profit/head	1.93	13.23	8.57
Cost of implants	.....	1.62	.18
Net profit/head	1.93	11.61	8.39

Special Comments: no charge made for implanting; no sickness or death loss.
Test Location: Sudan Livestock & Feed Co., Texas; Fattening Procedure: full feed (feed lot); days on test: 122; Sex: steers; breed: mixed.

TABLE 2

	Control	Synovex-H
Number of head	90	90
Average in-weight	456	454
Average out-weight	705	741
Average daily gain	2.34	2.64
Feed consumption/day	23.72	24.89
Feed cost/day	.49	.52
Feed conversion ratio	10.12	9.42
Cost per lb. of gain	.21	.19
Average selling price/cwt.	20.95	21.18
Gross profit/head	12.13	16.98
Cost of implants	.....	1.62
Net profit/head	12.13	15.36

Test Location: Sudan Livestock & Feed Co., Texas; date: 10/3/57; fattening procedure: feed lot; days on test: 106-8; sex: Heifers; breed: Mixed.

Hormonal control by the implantation of long lasting pellets of natural hormones or diethylstilbesterol is increasing in popularity. The use of diethylstilbesterol in poultry was described in 1945 by Lorenz.[5] Twenty mg./bird injected subcutaneously produced a carcass of capon like quality, but with no reported increase in rate of gain.

This procedure was carried over to steers and lambs by the Purdue group.[6-7] They observed an increase in rate of gain and also in improvement in feed conversion. The dose reported by their work and others varies from 6 mg. to 120 mg. per head for steers.

Some objections to the implanting of diethystilbesterol which have been cited are: an adverse effect on carcass quality, undue restlessness, changes in conformation such as raised tail heads, patchiness of fat, udder development. Methods of reducing these side effects have been carefully studied by several companies and by state experiment stations. Their work resulted in the discovery that in the steer a combination of estrogen and progesterone in implant form resulted in a modulation of the estrogenic activity so that the desirable stimulation of weight increase is secured and at the same time the side effects are suppressed. This effect was also secured in lambs by a balancing of the action of the same hormones. The first reports were by Galloway[8] in lambs and by Deans[9] in steers. Both investigators reported that the hormone combination resulted in faster gains on less feed and that treated animals were equal or superior to control animals. These formulations have been refined and are now produced commercially as a 20 mg. estradiol benzoate — 200 mg. progesterone pellet for steers (Synovex-S — Squibb) and a 2.5 mg. estradiol benzoate — 25 mg. progesterone pellet for lambs (Synovex-L — Squibb).

The use of progesterone — estradiol in heifers was unsuccessful since the combination, in mimicking the pregnant animal, resulted in an increase in udder and teat development so that the virgin heifer was sometimes judged to be with calf. It was reasoned that the use of testosterone in combination with estradiol would regulate the side effects and perhaps contribute an anabolic action. The formulation which was developed is 20 mg. estradiol benzoate — 200 mg. testosterone propionate. (Synovex H — Squibb). These preparations have been tested over a wide variety of feeding situations in both feed lot and state experiment stations.

A controlled test was made at a commercial feed lot in west Texas on the estradiol-progesterone steer preparation and the result is presented in table 1. Results of a test at the same site with the estradiol-testosterone combination for heifers are presented in table 2. Work on the estradiol-progesterone combination for lambs has been conducted at a feed lot in Mitchell, Nebraska and is reported in table 3. Table 4 summarizes the published results of the Kansas Experiment Station[10] with this same preparation.

The efficacy of the natural hormone combination in eliminating side-effects has been recently confirmed by Gassner[11] working with other esters of these same hormones. He has reported on a combination of estradiol valerate 24 mg., testosterone enanthate

TABLE 3

	Control	Synovex-L
Number of head	100	300
Average in-weight	79.2	76.2
Average out-weight	93.8	96.1
Average daily gain	.47	.62

Test Location: Mitchell, Nebraska; fattening procedure: full feed; days on test: 52; sex: mixed (ewes and wethers); lambs.

TABLE 4

	Control	Synovex-L
Number of head	39	39
Average in-weight	77.2	77.4
Average out-weight	105.7	111.9
Average daily gain	.23	.28
Feed cost/lamb $	4.92	5.07
Feed conversion ratio	25.1	22.1
Cost per lb. of gain	17.26	14.70
Average cost/cwt. $	21.67	19.66
Cost of implants	.....	.50
Average net cost/head $	21.67	21.16

Test Location: Garden City, Kansas Agricultural Experiment Station; date: 1958; fattening procedure: full feed; days on test: 123; lambs.

60 mg. and progesterone caproate 60 mg. (Rapigain — Squibb) This combination, in the form of an injectable semi-solid paste, is effective in both steers and heifers. It should appear on the market soon. Its reported duration of action is not as long as the pellets previously described. Again it has the advantage of a modulated hormone action with estrogenic side effects minimized.

In the evaluation of any procedure intended for use in animal production whether it be castration, antibiotic feeding, or hormone implant there is one primary objective: it must make the producer money. The rate of gain, if increased, is of little value unless the cost of that gain is reduced. Any procedure introduced into the operation must not reduce the salability of the end product. If it does, buyer discrimination may result in a net loss to the producer regardless of how economical the production.

REFERENCES

1. Perry, T. W., Beeson, W. M., Hornback, E. C. and Mohler, M. T., Aureomycin for Growing and Fattening Beef Animals. *Jour. An. Sci.*, 13:3, 1954.

2. Burroughs, W., Culbertson, C. C., Kastelic, J., Cheng, E. and Hale, W. H., The Effects of Trace Amounts of Diethylstilbesterol in Rations of Fattening Steers. *Science*, 120:66, 1954.

3. Hale, W. H., Homeyer, P. G., Culbertson, C. C. and Burroughs, W., Response of Lambs Fed Varied Levels of Diethylstilbesterol. *Jour. An. Sci.*, 14:909, 1954.

4. Sherman, W. C., Hale, W. H., Reynolds, W. M. and Luther, H. G., Nutritional Use of Tranquilizer in Cattle and Lamb Rations. *Jour. An. Sci.*, 16:1020, 10, 1957.

5. Lorenz, F., The Influence of Diethylstilbesterol on Fat Deposition and Meat Quality in Chickens. *Poultry Sci.*, 24:128, 1945.

6. Andrews, F. M., Beeson, W. M. and Harper, C., The Effects of Stilbesterol and Testosterone on the Growth and Fattening of Lambs. *Jour. An. Sci.*, 8:518, 1949.

7. Andrews, F. M., Beeson, W. M. and Johnson, F. D., The Effects of Hormones on the Growth and Fattening of Yearling Steers. *Jour. An. Sci.*, 9:677, 1950.

8. Galloway, J. H., Bratzler, L. J., Blakeslee, L. H. and Meites, J., Effects of Stilbesterol-progesterone implants on Growth and Carcass Quality of Lambs. *Jour. An. Sci.*, 11:792, 1952.

9. Deans, R. J., Van Arsdell, W. J., Reineke, E. P. and Bratzler, L. J., The Effects of Progesterone-estradiol Implants and Stilbesterol Feeding on Feed Lot Performance and Carcass Characteristics of Steers. *Jour. An. Sci.*, 15:1020, 1956.

10. Kansas Agriculture Experiment Station, Manhattan, Kansas, 45th Annual Livestock Feeders Day, Cir. 358, May 1958.

11. Gassner, F. X., Reifenstein, Jr., E. C., Effect of 17- Hydroxyprogesterone 17-n Caproate on Growth and Fattening of Cattle. Annuals of the New York Academy of Sciences 71, ART 5:572, 1958.

Using cultural methods, the writers demonstrated persistence of L. pomona *in kidneys of calves after leptospiruria had ceased. Results indicate that survival of viable lpetospires in the host's tissues is necessarily an important consideration.*

Detection of Viable L. pomona in Bovine Kidneys After Leptospiruria Had Apparently Ceased

S. G. KENZY, D.V.M., Ph.D., G. H. KEOWN, M.Sc. W. OKAZAKI, M.S., R. W. H. GILLESPIE, Ph.D. and L. M. RINGEN, Ph.D.

College of Veterinary Medicine
State College of Washington
Pullman, Washington

LEPTOSPIRES ARE CHARACTERIZED by their affinity for kidney tissues of the susceptible hosts. As a result of this localization, leptospiruria occurs. Since serum agglutination-lysis (AL) antibodies may persist for several years in cattle following infection, the possible survival of viable leptospires in the host's tissues must be considered.

In order to obtain more information concerning the persistence of viable leptospires in renal tissues, biopsies were performed on cattle which had ceased shedding (as determined by negative AL tests on sera from hamsters inoculated with the bovine urine specimens). Kidney tissues were cultured and also inoculated into hamsters to determine if leptospires were present.

Scientific paper no. 1692, Washington Agricultural Experiment Stations, State College of Washington, Pullman, project 1176.

This investigation was supported in part by research grants E707, C1, C2, C3 from the National Institutes of Health, Public Health Service and funds provided for biological and medical research by the State of Washington, Initiative Measure no. 171, project 144.

Methods

Calves, four to eight months of age, were exposed by instilling virulent *Leptospira pomona* culture into each nostril and conjunctiva. Presence of infection was confirmed by positive agglutination-lysis (AL) tests and by demonstration of leptospires in the urine. Kidney specimens (1 to 3 gm.) were collected aseptically by surgery under local anesthesia after leptospiruria had ceased. Saline suspensions (10%) of the kidney tissue were prepared through comminution in a Ten Broeck or Erway tissue grinder.

Each kidney suspension was serially diluted and cultured in Ringen's[1] medium to give final dilutions of 1:50 1:500 and 1:5,000; ½ ml. from 1:5 and 1:500 dilutions, respectively, was inoculated subcutaneously into 35 day old hamsters. These hamsters were held for 5 weeks in individual cages and then bled and tested for the development of AL antibodies against *L. pomona.*

Results and Discussion

From the data in table 1, it is apparent that viable leptospires were present in the kidney tissues of calves no. 211 and 216 after leptospiruria had ceased. In case of

calf no. 216, 54 days had elasped since leptospires had been revealed in the urine.

It is interesting to note that the 1:50 culture dilutions failed to support growth. We have often observed that lower dilution cultures of Leptospira infected kidney tissues from hamsters and guinea pigs are negative, whereas higher dilutions support heavy growth. Data in table 2 indicate that AL antibodies may be present in the kidney tissues at the 10^{-2} dilution. Dinger[2] reported that these immune bodies inhibited the growth of leptospires in certain culture studies. Possibly the agglutination-lysis antibodies present in these kidneys were responsible for the inhibition of growth.

Hamsters inoculated with kidney tissue suspensions failed to develope serologic evidence of infection (table 1). Thus, it appears that cultural methods, as employed in this investigation, are more sensitive for the detection of leptospires in renal tissue.

Gochenour, *et. al.*,[3] have found cultural methods superior to laboratory animals for the isolation of leptospires from blood. The effect of higher dilutions (1:500 and 1:5,000) on Leptospira isolations should be studied further. Possibly negative findings in numerous earlier trials[4] were due to the employment of lower dilutions of kidney tissue for culture (1:5 and 1:50).

It is difficult to evaluate the epizootiological significance of localized leptospires in the kidney. (No leptospires were observed in Levaditi-stained sections of kidney tissues. Typical foci of mononuclear cells were observed in hematoxylin-eosin-stained kidney sections from each of the calves.) Such organisms may act as an antigenic stimulus for continued formation of antibodies and under conditions of severe stress appear intermittently in the urine to serve as a source of infection.

TABLE 2. Antibody Levels in Bovine Kidneys

Animal No.	Antibody Titration[a] 10^{-2}	10^{-3}
211	+[b]	±[c]
212	—[d]	—
216	+	±
223	+	—
247	—	—

[a]Bases on AL tests.
[b]More than 50 percent of leptospires agglutinated or lysed.
[c]Less than 50, but more than 10 percent agglutinated or lysed.
[d]No agglutination or lysis of leptospires.

Summary

1. Persistence of *L. pomona* in the kidneys of two calves 14 and 54 days after leptospiruria had ceased was demonstrated by cultural methods, but not by hamster inoculation.

2. In cultures of kidney tissues from two calves, leptospires grew at higher dilutions, but not at the lowest.

3. Agglutination-lysis antibodies were demonstrated in renal tissues from some calves. The apparent influence of such antibodies on recovery of leptospires is discussed.

REFERENCES

1. Ringen, L. M., and Gillespie, R. W. H., A Simple Medium for the Cultivation of Leptospira. *Jour. Bact.*, 67:252, 1954.

2. Dinger, J. E., On Leptospirosis. Cited by Van Thiel, P. H., in the Leptospiroses, Universitaire Pers Leiden, 1948, p. 23.

3. Gochenour, W. W., Yager, R. H., Wetmore, P. W., and Hightower, J. A., Laboratory Diagnosis of Leptospirosis. *Am. Jour. Pub. Health*, 43:405, 1953.

4. Unpublished data.

TABLE 1. History of Infected Calves and Results of Biopsy Studies

Animal no.	Last day[a] of shedding	Days since shedding stopped	Biopsy Studies: Dilutions Cultured[b] 1:50	1:500	1:5000	Dilutions Inoculated[c] 1:50	1:500
211	63	14	—[d]	+[e]	+	—	—
212	49	54	—	—	—	—	—
216[f]	50	54	—	—	+	—	—
223	35	68	—	—	—	—	—
247	49	54	—	—	—	—	—

[a]Days since exposure.
[b]Based on grams of tissue in the total volume. Cultures examined for six weeks after inoculation.
[c]Inoculated subcutaneously into 35 day old hamsters. (0.5 ml).
[d]No leptospires observed.
[e]Leptospires present.
[f]Kidney tissue from this calf inoculated into hamsters and cultured 98 days after shedding ceased was negative for the presence of leptospires.

SMALL ANIMAL PRACTICE

How would YOU diagnose this?

CASE NO. 7 Female Boxer, six years old. Pronounced limp, left rear leg. Patient overweight, held affected leg without bearing weight on it. Ventro-dorsal projection of pelvic and femoral area is shown above.

What would be *your* diagnosis and treatment for this case? Turn to the page indicated below, for diagnosis and information about a dramatic new treatment regimen which has proved highly effective in cases like this.

turn to page XLV

Clinical observations of 32 animals suffering with urinary tract infections are reported. Treatment with nitrofurantoin resulted in rapid control of clinical manifestations in over 90% of cases. Bacteriological cures were achieved in 40% of the animals treated.

Urinary Tract Infection of Small Animals

Clinical Observations and Treatment

J. E. MOSIER, D.V.M., M.S.
EMBERT H. COLES, D.V.M., M.S., Ph.D.

School of Veterinary Medicine
Kansas State College
Manhattan, Kansas

URINARY TRACT INFECTIONS in small animals often elude diagnosis, especially when they are secondary or associated with another disease. However, these infections may be more frequent than generally assumed. Chronic or acute pyelonephritis is found in about 5% of all routine autopsies of the dog and cat.[1] Evidence of interstitial nephritis may be found in 55% of routine autopsies and in 80% of dogs eight years of age or older at time of necropsy.[2] Urinary tract infections are also of prime importance in the genesis of canine urolithiasis.[3] Early diagnosis and prompt effective treatment is, therefore, highly desirable.

This report describes clinical experience with nitrofurantoin (Furadantin — Eaton) in the treatment of these infections in dogs and cats. Furadantin is one of the synthetic antimicrobial nitrofurans.[4] Upon peroral administration, this drug achieves high urinary concentrations and exerts pronounced antibacterial action throughout the urinary tract. It is bactericidal to common pathogens at about the same concentrations as the broadspectrum antibiotics, but does not permit development of significant bacterial resistance.[5] The drug is used widely and with success in human medicine for the treatment of urinary tract infections.[6,7,8] In veterinary medicine it has proved effective in the treatment of epizootic canine tracheobronchitis (kennel cough).[9] Favorable results with this product in urinary tract infections in preliminary studies with small animals have also been reported.[10] The drug was reported a valuable adjunct to surgical drainage in a case of canine prostatic abscess.[11]

Patients described in this report are dogs and cats presented for diagnosis and treatment at the Dykstra Veterinary Hospital, Kansas State College, Manhattan. A total of 25 dogs, 12 of which were bitches; and seven cats, two of which were females were presented.

Contribution No. 167, Department of Veterinary Medicine, Kansas Agricultural Experiment Station, Manhattan. This work was supported in part by Eaton Laboratories, Norwich, New York.

Clinical Symptoms

Tentative diagnosis of bacterial urinary tract infection was based in each case on history and clinical findings. Partial to complete anorexia and lethargy were reported by owners in 85% of the patients later proved to have urinary tract infection. Stiffness of the hind quarters, reluctance to move, and arching of the back were reported (in varying degree) by 79% of the owners. Other symptoms noted were muscular tremors, vomiting, straining, diarrhea, and hematuria.

On clinical examination, the body temperatures were normal or slightly elevated. Evidence of pain could be elicited upon palpation over the kidney region in approximately 90% of cases. Scleral injection was frequently observed.

Laboratory Studies

In the early phases of this study, throat swabs and blood samples were cultured bacteriologically and compared with urinary studies. Organisms cultured from throat swabs were not the same as those cultured from urine. Blood cultures were routinely negative in clinical cases.

Hematological study routinely revealed normal erythrocyte counts and moderate leukocytosis. Differential blood counts tended toward a slight shift to the left. Blood urea values ranged from 20 to 100 mg. per 100 ml.

Urine samples from dogs were collected by means of sterile catheters. Manual expression of the bladder with collection of the urine in sterile test tubes proved to be the most satisfactory method for collection of samples from cats. In a few instances, the bladder was tapped through the abdominal wall and urine collected in a sterile syringe.

Urinalysis gave variable data and the presence of urinary tract infections did not seem to parallel laboratory findings with consistency. The most reliable method for diagnosis of urinary tract infection involves culture of aseptically collected urine.

Tests for protein were positive in 50% of the cases, and ranged from a trace to four-plus readings. The pH of the urine ranged from 4.8 to 8 with 71% of the readings below 7. Occult blood was reported in 50% of urine samples. Urinary leukocyte counts revealed more than five white blood cells per high-power field in 66% of cases, the average being 25 to 30. Red blood cells, casts, epithelial cells, and bacteria were reported with varying frequency.

Organisms isolated from the urine are reported in table 1. *Escherichia coli* was the most common etiological agent in feline urinary tract infections, whereas in dogs, Proteus sp. occurred more frequently. Dual infections were more common in the dog (11.6%) than in the cat (3.7%). Possible sources of infection or predisposing factors were present in 23% of the patients (table 2).

All bacteria isolated were tested for sensitivity to Furadantin. No instance of total resistance to the drug was noted. However, in case no. 28 results of sensitivity tests indicated that the organism was only slightly susceptible to Furadantin after four day treatment.

Furadantin was given perorally at a dosage ranging between 4 and 10 mg. per pound of body weight per day. These doses were divided into three or four equal portions and given with meals to reduce nausea or emesis. Length of treatment averaged 10 days, ranging from 5 to 15. A second course of treatment was given in four cases, including one dog (case no. 22) treated with interruptions for a total of 11 weeks.

In several cases other medications were used following recurrence or failure with Furadantin therapy. The clinical course of these is described in the case report.

TABLE 1. Microorganisms Causing Urinary Tract Infection in Dogs and Cats

Bacteria	Dog Cases	Dog % of Total	Cat Cases	Cat % of Total
E. coli	12	22.6	16	61.5
Proteus sp.	17	32.1	1	3.9
Streptococci	11	20.7	6	23.1
Staph. aureus	10	18.9	3	11.5
Aerobacter	1	1.9		
Alcaligenes	1	1.9		
Pseudomonas	1	1.9		
Total	53	100.0	26	100.0

Dual infection occurred in 7 (11.6%) of canine patients: 4 cases of *E. coli* with Str. sp.; 1 each of Aerobacter sp. with *Staph. aureus*, Proteus sp. with *Staph. aureus*, and *E. coli* with Proteus sp. Dual infection also occurred in 1 (3.7%) cat: *E. coli* with Proteus sp.

TABLE 2. Possible Source of Infection or Predisposing Factor in Urinary Tract Infection

Condition	Urinary Organism	Dog	Cat
Histoplasmosis	*E. coli* & Str. sp.	1	
Vesical calculi	*Staph. aureus*	2	1
Enteritis	*E. coli* & Str. sp.	1	
	Proteus sp.	1	
	E. coli		1
Prostatitis (chronic)	Proteus sp.	1	
Diabetes	Alcaligenes sp.	1	
Uremia	*E. coli*	1	
Intervertebral disc syndrome	*E. coli*	1	
Spondylitis deformans	Proteus sp.	1	
Urethral obstruction	*E. coli*		1
Chronic constipation w/intermittent diarrhea	*E. coli* & Str. sp.	1	
Recurrent pneumonia	*Staph. aureus*	1	
Chronic Hep. w/ascites	*Staph. aureus*	1	
Leptospirosis	*Staph. aureus*	1	
Exudative pleuritis	*Staph. aureus*		1
Recurrent abscess	*Staph. aureus*		1
Total		14	5

Results

Treatment with Furadantin was effective in producing rapid clinical improvement in 29 of 32 patients. However, sterilization of urine was achieved in less than half of the cases (table 3).

The bacteriological effectiveness of the drug in urinary tract infections in small animals is indicated in table 4. Urine became sterile in 40.6% of dogs and cats in this series. This is to be compared with 90.6% effectiveness of Furadantin in producing symptomatic clinical improvement, although in some instances clinical symptoms recurred after treatment was discontinued. In 21.8% of the cases in which the original bacterial infection was eliminated, a substitute infection with another species developed.

Case Reports

Some of the cases summarized in table 3 were treated repeatedly with Furadantin or other drugs, with varying results as illustrated in the following case histories.

Case 3. A five-year-old male Persian cat with a history of anorexia, lethargy, and abdominal tenderness was presented. Culture of the urine was positive for *E. coli.* Treatment with 25 mg. Furadantin t.i.d. for 6 days was accompanied by rapid clinical improvement. No urine culture was accomplished at this time. Six months later, symptoms recurred and urine culture revealed *E. coli.* Chloramphenicol (50 mg.) was administered t.i.d. for five days. One week later urine culture was negative. However, symptoms persisted, and three weeks later urine culture was again positive for *E. coli.* A second course of Furadantin was administered at the rate of 25 mg. t.i.d. for 14 days. Thirteen days after the end of this course, and six months later, urine cultures remained positive for *E. coli.*

Case 4. A 13-year-old male Persian cat with a history of hematuria was presented. Urine culture was positive for *E. coli.* Furadantin (25 mg.) administered q.i.d. for eight days produced no apparent clinical improvement; urine culture was positive three days later. Chloramphenicol (50 mg.) t.i.d. for five days produced gradual improvement, but urine culture remained positive for *E. coli.* Sulfisoxazole was then administered for five days, but ten days after the conclusion of this treatment, urine culture was still positive for *E. coli.*

Cases 3 and 4 illustrate the difficulty of producing bacteriological cures in some cases of urinary tract infections in small animals.

Cases 14 and 22 illustrate recurrence of the infection after treatment with Furadantin had produced sterile urine culture. In both of these dogs, complicating conditions were present. In case 14, a six year old female German Shepherd with nephritic eczema and urine culture positive for *E. coli,* Furadantin (100 mg.) t.i.d. for eight days produced prompt clinical improvement and sterile urine six days after the conclusion of treatment. One month later, the dog's hair was thick and glossy, but four months later, the skin condition recurred and urine culture revealed *Staphylococcus aureus* and Proteus sp. Furadantin therapy was repeated, 100 mg. t.i.d. for 14 days, but 30 days later urine culture was positive for the same organisms. After treatment with penicillin and streptomycin for five days, three consecutive urine cultures were negative. However, four months later the patient was again presented for treatment and died of uremia 36 hours after admission. Culture of the urine during this last admission was

negative. This case illustrates a temporary sterilization of the urine, followed by establishment of different pathogenic organisms in the urinary tract which may have been damaged in such a way as to predispose it to bacterial infection. Similar substitute infections were noted in 24% of the dogs and 14% of the cats in this series.

In case 22, symptoms of urinary tract infection were present in a 5 year old male Dachshund with a history of an intervertebral disc syndrome of one month duration. *E. coli* was cultured from the urine and 50 mg. Furadantin administered t.i.d. for ten days. Clinical signs of infection receded during therapy and five days after its termination, urine culture was negative. One month later there was a recurrence of pain over the kidney area and hemolytic streptococci were isolated from the urine. Oxytetracycline 50 mg. t.i.d. for 10 days alleviated clinical symptoms, but five days later urine culture was positive and symptoms returned. Treatment was reinstituted with Furadantin 50 mg. t.i.d. for one week, 25 mg. t.i.d. for two weeks and 25 mg. b.i.d. for one week. Shortly after conclusion of this prolonged course of treatment, urinalysis revealed 4+ sugar; hemolytic streptococci were still present in the urine. One week later, the dog died as a result of diabetic ketosis.

The predisposing factor in this case may have been the intervertebral disc syndrome. The sequence of events may also indicate that the presence of pathological conditions involving neural pathways of the urogenital tract may prevent bacteriologic cures of secondary bacterial infections.[11] The same comment might apply to the following case:

Case 27. An 11 year old female Pointer with signs of urinary tract infection and urine culture was positive for Proteus sp. Spondylitis deformans was a complicating condition. Treatment with Furadantin 100 mg. t.i.d. for eight days produced clinical improvement, but 18 days after the end of

TABLE 3. Bacteriological Results with Furadantin Therapy

No.	Age (Yr.)	Patient	Organism(s)	Furadantin Daily Dose (mg.)	Days of Treatment	Results of Posttreatment Culture	No. Days Posttreatment Culture Made
1	4	Domestic Cat	*E. coli*	40	6	*E. coli*	6
2	9	Persian Cat	*E. coli*	75	5	*E. coli*	5
3	5	Persian Cat	*E. coli*	75	6	*E. coli*	168
4	13	Persian Cat	*E. coli*	100	8	*E. coli*	3
5	2	Persian Cat	*E. coli*	100	6	Negative	3
6	1	Domestic Cat	*E. coli*	100	10	Negative	3
7	9	Domestic Cat	*E. coli*	75	8	Negative	105
8	1	Peke	Str. sp.	150	14	Negative	40
9	8	Cocker	A. sp. & *Staph. aureus*	300	14	Negative	18
10	3	Boxer	*Staph. aureus*	200	14	*Staph. aureus*	13
11	4	E. Setter	*Staph. aureus*	400	6	Negative	4
12	7	Cocker	Proteus sp.	150	5	Proteus sp.	7
13	7	Brittany	*E. coli*	300	10	Negative	4
14	6	G. Shepherd	*E. coli*	300	8	Negative	6
15	9	Setter	Str. sp.	300	10	Negative	18
16	1.25	Pointer	Proteus sp.	300	15	Str. sp.	31
17	5	Labrador	Proteus sp.	300	12	Negative	4
18	6	Boxer	*E. coli* & Str. sp.	300	10	*E. coli*	3
19	6	Pointer	Aerobacter sp.	300	6	Str. sp.	3
20	6	Pointer	*E. coli* & Str. sp.	200	14	Negative	4
21	2.5	Cocker	Str. sp.	150	13	Negative	10
22	5	Dachshund	*E. coli*	150	14	Negative	5
23	6	Dachshund	*Staph. aureus*	200	6	Negative	2
24	6	Pointer	*E. coli*	300	10	*E. coli*	4
25	1	Dachshund	*Staph. aureus*	150	13	Str. sp.	2
26	1.5	Boxer	Proteus sp.	300	12	Proteus sp.	46
27	11	Pointer	Proteus sp.	300	8	Proteus sp.	18
28	4	Pointer	Proteus sp. & *Staph. aureus*	300	14	*E. coli*	5
29	9	Cocker	Proteus sp.	150	5	Proteus sp.	18
30	1.5	Beagle	Alcaligenes sp.	150	14	Negative	11
31	8	Dalmatian	*E. coli* & Str. sp.	300	14	Negative	14
32	7	Springer	Proteus sp.	200	6	Proteus sp.	7

the treatment, culture was still positive for Proteus sp., remaining so seven days after a course of treatment with 5 grains methenamine t.i.d. Ten months later, partial paresis occurred due to the spondylitis deformans. Euthanasia was performed at the owner's request.

An apparent spontaneous bacteriologic cure of urinary tract infection was observed in two cases. Both were female dogs from whose urine *Staph. aureus* was isolated. In case 10, a 3 year old Boxer, 50 mg. Furadantin q.i.d. for 14 days produced an apparent clinical cure. Urine culture was positive for the same organism two weeks later, but after four weeks the urine culture was sterile although no further treatment had intervened. In case 23, a 6 year old Dachshund had cystic calculi and urine culture was positive for *Staph. aureus*. Furadantin 50 mg. q.i.d. for six days produced rapid clinical improvement and urine culture was negative two days later when cystolithotomy was performed. However, culture of the urine 48 hours postoperatively was positive for *Staph. aureus*. No further treatment was given in the absence of specific signs of infection, and six months later urine culture was negative.

Occasional transient nausea which usually disappeared without necessity to discontinue treatment or decrease doses was noted during Furadantin therapy. In some instances nausea could be controlled only by administering Furadantin in the food or simultaneously with food. Persistent nausea and vomiting occurred in 8.7% of the dogs and 11% of the cats. This side effect forced discontinuation of therapy in 9.3% of cases.

TABLE 4. Summary of Results of Furadantin Therapy

Dogs	Cats	Posttreatment Culture	Organism	%
10	3	Negative		40.6
7	3	Positive	Unchanged	31.25
6	1	Positive	Changed	21.9
2		Positive, becoming negative		6.25

Discussion

Results of a screening survey would suggest a bacterial etiology in an estimated 25% of those patients suspected of a urinary tract disorder. The route of infection, while not definitely known in individual cases, may be either through the blood stream, the lymphatic system, or an ascending urinary tract infection. The apparent difficulty in establishing a urinary tract infection in the bladder or renal pelvis in the absence of trauma or urinary stasis would seem to minimize the importance of the ascending route. The ease with which bacterial urinary tract infection can be established by injecting the bacteria into the renal artery has tended to emphasize the hematogenic route of infection. The results of routine urinalysis do not offer a conclusive method by which a bacterial infection can be diagnosed. The absence of albumen, the small number of leukocytes and casts, the variable pH and specific gravity, in many instances, would be misleading if one is accustomed to placing significant importance to such data in the diagnosis of bacterial infections of the urinary tract. The only method suitable for accurate diagnosis of such infections is to culture aseptically collected urine specimens.

The importance of mechanical obstruction, intestinal disorder, and systemic influences as predisposing factors in urinary tract infections should not be underestimated. It would appear that these factors are of sufficient importance to warrant consideration in any patient with bacterial urinary tract infection. (The infection may have preceded the occurrence of the syndromes listed in table 2.) However, pathogenesis of urinary tract infections seems to support the theory that the infection may be secondary.

Regardless of whether the urinary tract infection is primary, secondary or merely coexistent, the necessity of a complete and thorough examination of the patient cannot be overemphasized. The results of therapy and prognosis of the present condition may well be determined by thoroughness of the initial examination. Although nitrofurantoin controlled clinical manifestations of urinary tract infection in more than 90% of the cases in this study, bacteriological cures were less common. The effects of more prolonged therapy on the percentage of cures

is not known. It would appear that minimum length of treatment should be 12 days and possibly much longer for optimum results.

The extent of tissue changes due to the infection may preclude either bacteriological cures or the permanency of such cures. Eradication of bacteria from interstitial tissue of the kidney seems to be extremely difficult in chronic infections. This observation, coupled with instances of substitute infections after apparent sterilization of the urine, serves as effective deterrent to overoptimism on the part of the clinician confronted by a patient with chronic urinary tract infection.

Conclusion

Observation based on 32 animals treated with Furadantin for urinary tract infections may be summarized as follows:

1. Furadantin rapidly controlled clinical manifestations of urinary tract infections in more than 90% of 32 cases.

2. The drug produced bacteriologic cures in 40% of cases.

3. The minimum length of treatment should be 12 days. For optimal results, longer periods of treatment may be necessary.

4. Mixed infections, change of bacterial flora, and complicating factors make it difficult to achieve bacteriologic cures.

5. Urinary tract infections in small animals should be regarded as possibly secondary in nature until a thorough examination reveals no other primary condition.

6. Each recurrence should be investigated as thoroughly as the original episode to avoid overlooking a more serious underlying condition.

7. Nausea and vomiting due to Furadantin can be reduced to a minimum by administering the drug with some food.

REFERENCES

1. Bloom, F., Pathology of the Dog and Cat. American Veterinary Publication, Inc., Evanston, Ill., 1954, p. 110.
2. Bloom, F., Pathology of the Dog and Cat. American Veterinary Publication, Inc., Evanston, Ill., 1954, p. 89.
3. Brodey, R. S., Canine Urolithiasis. A Survey and Discussion of Fifty-Two Clinical Cases. *Jour. Am. Vet. Med. Assn.*, 126:1, 1955.
4. Roberts, H. D. B., Antimicrobial Nitrofurans in Mastitis and Dermatomycoses. *Vet. Med.*, 48:224, 1955.
5. Waisbren, B. A. and Crowley, W., Nitrofurantoin. Clinical and Laboratory Evaluation. *Am. Med. Assn. Arch. Int. Med.*, 95:653, 1955.
6. Hasen, H. B. and Moore, T. D., Nitrofurantoin. A Study in Vitro and in Vivo in One Hundred Cases of Urinary Infection. *Jour. Am. Med. Assn.*, 155:1470, 1954.
7. Stewart, B. L. and Rowe, H. J., Nitrofurantoin (Furadantin) in Treatment of Urinary Tract Infections. *Jour. Am. Med. Assn.*, 160:1221, 1956.
8. Nesbitt, R. E. L. and Young, T. E., Urinary Tract Infections During Pregnancy and the Puerperium., Treatment with Nitrofurantoin (Furadantin). *Obst. and Gynec., N. Y.*, 10:89, 1957.
9. Mosier, J. E., A Preliminary Report on the Use of Nitrofurantoin in Treatment of Canine Tracheobronchitis (Kennel Cough). *Vet. Med.*, 50:605, Nov., 1955.
10. Belloff, G. B., Furadantin. *California Vet.*, 9:27, 1956.
11. Pollock, S., Prostatic Abscess in the Dog. *Jour. Am. Vet. Med. Assn.*, 129:274, 1956.

An Emasculant and Tranquilizer for Male Dogs

Feeding experiments have shown when Diethylstilbestrol is added to feeds in minute quantities it has a depressing action on the male. It reduces the sexual activity and the functional activity of the testes.

Used in a comparable dosage for intermuscular injection. Repeated weekly, the outlook, disposition and characteristics of ferocious, nasty, ugly tempered male dogs are improved. A hard to handle male changes in as little time as one week. A few may take longer.

Dosage used is: 10 mg. for small dogs, 15 mg. in medium size dogs, 25 mg. in large dogs. For the ambulatory cases, 5 mg. enteric coated Diethystilbestrol tablets are dispensed. A tablet every third day until ten or twelve tablets are given.

Tranquilizing by this method will also desex the male and thereby not transmit to offspring this mean disposition. There will be no offspring in the majority cases. Diethystilbestrol can not be used on the normal female because of carcinogenic action. In the spayed female it is good replacement therapy. It also stops incontinence.

Fractures in Birds Repaired With The Jonas Splint

ALAN C. SECORD, B.V.Sc., M.Sc., D.V.Sc.

Toronto, Canada

ON JANUARY 1, 1957, shooting vandals attacked our wild bird sanctuary at Goodward, which is east of Markham in Ontario. One of the few survivors was a wild Canadian goose named Jonathan. It was born in the wild fowl sanctuary at our farm near Stouffville, and was then three years of age.

A radiograph (fig. 1) taken the next day at the Secord Animal Clinic revealed a sharp-pointed oblique fracture of the radius at the midshaft, and a comminuted spiral fracture of the ulna (which in the bird is larger than the radius), with jagged and sharp points. Fractured ends were overriding, and a fragment of the ulna, about 5 cm. long, was completely detached from the bone. Numerous spiculi of bone and lead pellets were embedded in soft tissue.

Fig. 1. Sharp-pointed oblique fracture of the radius at the midshaft, and a comminuted spiral fracture of the ulna in a goose. Note overriding, numerous spiculi of bone, lead pellets, and 5 cm. long fragment completely detached from ulna.

Repair of Fracture

An incision was made over the fractured area to expose the bones, and a Jonas Splint with the pin compressed within the tube was inserted into the medullary canal of the distal fragment of the ulna. The loose fragment was then slipped over the tube of the splint. Following alignment, the pin was projected into the proximal fragment of the ulna (fig. 2). The operative area was infiltrated with aqueous penicillin, and the wing folded and taped to the body for four weeks. Healing was uneventful, and a radiograph (fig. 3) taken four weeks after reduction revealed that osteogenesis was progressing satisfactorily. The lead pellets had become encapsulated, and the small fragments of bone had become absorbed and incorporated into a good callus.

The goose was fretting so much in captivity that it was released with other geese

Fig. 2. Immediately after reduction. Tube of Jonas Splint within medullary canal of distal ulna; loose fragment approximated and slipped over splint; pin projected into aligned proximal fragment of ulna.

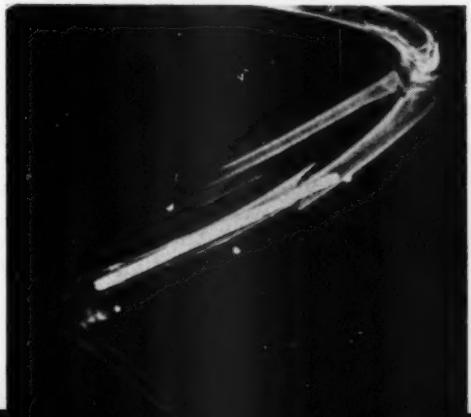


Fig. 3. Four weeks after reduction. Position of splint is unchanged. Normal proliferation of osteogenic tissue, with all fragments becoming incorporated into a healthy callus.

at this time. Use of the wing appeared to be normal, but the goose did not fly because of pinion feather loss until after its August moult.

Jonathan flew south to Florida on December 16 as a member of a flock of 11, and while other wild geese flew to the Arctic, Jonathan returned to the sanctuary of birth on April 1, 1958 with a bride and remained to raise a family of goslings.

Fracture in a Red-Tailed Hawk

A second case involved the fracture of a bone in the wing of a red-tailed hawk. At the time the bird was presented, the wound was badly infected, gangrenous and several days old.

After extensive debriding of necrotic tissue, the smallest Jonas splint was inserted, the wound flooded with aqueous penicillin, and the folded wing taped in position to the body. Penicillin streptomycin was administered daily in the breast muscle for five days. The wing itself was untaped five weeks after repair. The hawk was kept in a large flight cage on the roof during the winter. It was released in the spring of 1958, flew perfectly, and remained around the hospital for weeks, consuming numerous pigeons, weiners and most of a 12 lb. smoked Virginia ham which had been hung under the roof in the shade for safekeeping — a most unhawklike diet, according to eminent ornithologists who list this breed as a harmless beneficial hawk with a diet of mice and grasshoppers. No *x*-ray plates were made of the fracture.

Fracture in a Wild Duck

A third bird treated at our wild bird sanctuary was a wild duck with a fractured humerus.

Following open reduction and insertion of the smallest Jonas splint, the bird recovered uneventfully. The duck was released October 5, 1958 and flew strongly, apparently without impairment. Healing time was 24 days.

I often wonder what some hunter will think if he shoots this duck and finds the splint while carving the bird for a special meal.

First-aid treatment of wild birds has been a labour of love with me, and I have treated hundreds brought in by ornithologist friends and bird lovers. With the clinical experience of these three successful fracture treatments as a background, I look forward to saving so-called hopeless fracture cases in wild and caged birds.

Salt Kills Mites

A salt brine solution is recommended as a sure way to eliminate the gray chicken mite, one of the worst pests known to the home chicken flock. A bucket of water and a pound of common table salt thoroughly dissolved serves as an excellent solution with which to wet down roosts and adjoining walls. It is as effective as expensive preparations on the market.

Professional conduct and ethics are as much a part of the veterinary profession as the schools that prepare young men for a practice career. Here a young graduate outlines a practical approach to better professional conduct at the local level. Doctor Looby, now a pratcitioner at Middletown, Connecticut, is a graduate of Kansas State College. His report here was the winning entry in the 1958 Moss Essay Contest, sponsored by the American Animal Hospital Association.

Veterinary Ethics

What Can a Local Veterinary Association Do To Improve Our Client-Colleague Relationship in a Community

GEORGE P. LOOBY,† D.V.M.
Middletown, Connecticut

THE 1950s may well go down in the annals of history as a period of sweeping scientific and economic changes but, even more important, these years may mark the advent of a new concept in man's relationship with his fellow man. Throughout the world national leaders, as well as the elusive man-in-the-street, are slowly coming to the realization that questions arising between men and nations can best be solved in a manner other than the traditional concept of men under arms marching forth to assert their convictions.

To thinking men, men deeply concerned with the survival of society as we know it, the conference table, with its ensuing arbitration and conciliation, must take the place of the battlefield as a means of resolving world disputes. The concept of survival seems slowly to be winning out over "honor." The foundations for such changes in international behavior can be found in the most elemental units of the social structure.

The Social Structure

At the local level; the family, the neighborhood, the town and city, differences have long been settled by means other than physical force. The influence of these structural social units would seem logically to spread eventually to relationships at the international level.

In dealing with a rather narrow segment of society the problem would seem to be simple. Unfortunately, the problems to be overcome in improving conduct in this area are far from being so classified.

Superficially, the casual observer could be led to believe that a rather small group of highly specialized, well educated professional men would be able to conduct their intraprofessional relations on a high ethical and moral plane. We of the veterinary profession can consider ourselves fortunate that so little is known outside of our ranks

†Presented at the 25th Annual Meeting of the American Animal Hospital Association, Chicago, Illinois.

of insidious petty bickering and oftentimes malicious rumors that are all too commonplace within our ranks.

It is a callous reflection on veterinary medicine that there are men who we must, out of courtesy, call colleagues, but who continually resort to fee cutting, uncomplimentary remarks regarding fellow practitioners, and general unprofessional conduct. As long as conditions such as these prevail within our profession, the calling of veterinary medicine can never approach the level of achievement that thinking men would have it attain.

Inherently we are a small group and the foreseeable future offers no possibility that this situation will change. This, in itself, is perhaps good since we may be better able to achieve a common goal because of it.

An even smaller group exists at the level of the city and county organization. Here, as in all the affairs of men's relationships, an effective plan of action must be laid if they are to succeed. Far too often, the local organization would seem to exist almost exclusively as a social group which gathers once a month for a mutual session of back-slapping which, upon dispersing, sees its members return to their respective practices unmindful of their common purpose and goal. Obviously, positive action is called for.

Plan of Action

The idealist could easily chart a course of action whereby Doctors of Veterinary Medicine in a given area would band together and display a common purpose. Unfortunately we are seldom idealists; conversely we are too often largely a group of rather stout individualists with the idea in mind that whatever is good for the individual is good for the group. Since we are, for the most part, individual businessmen as well as veterinarians it is quite natural that our respective, self-centered interests should be uppermost in our minds. This, in itself, is good but we must never lose sight of our common aim.

To the novice who has yet to enter into the stark, cold reality of the business and professional world it would seem that the first and primary purpose of the local organization should be to present a unified front to the one they presume to serve, the client. Here we might list several factors or purposes that would serve to achieve this end.

A group of doctors serving a common area should first present a group of relatively uniform fees that would be consistent with the value of the service to the client as well as affording a fair measure of return to the practitioner. Nothing, it would seem, would cause greater doubts in a potential client's mind than to have a wide variation in the fees charged for standard services in a given area. Such a practice leads to a pick and choose method by the client based on the fee alone and not on professional competence. Certainly the profession stands to gain nothing by a wide variance in fees.

Petty deriding of colleagues to clients would seem almost unworthy of mention, but we cannot close our eyes to the fact of its existence and certainly we cannot condone it. It would seem almost trite to mention the possible effects of this practice in the estimation of our clients. What better place than this can we choose to insert the application of the Golden Rule?

Professional Standards

From the standpoint of the young Doctor of Veterinary Medicine who may eventually choose to enter a community where practitioners are already established, it would seem wise for the local association to have a board with whom the young man might meet. There are few situations that serve to frighten off the fledgling more quickly than a frank initial rejection by his peers. Rather than this latter approach, it would seem both professional and logical to have the board meet with their prospective colleague and frankly, honestly, and openly discuss the possible advantages and disadvantages of the area. Following such an appraisal the board would then allow him to make his own decision as to whether to locate in the area or not. The local association, by following such a course of action, might well be the better for it.

No more than we can approve of the flinty, immovable traditionalist can we look

without reproach upon the complete conformist. Clients, in their search for professional advice, are looking for the man who appeals to them in his manner, his outlook, and general bearing. The local association should not deprive the client of this right by making the rules of conduct too rigid and uniform.

In so far as it is possible within the limits of professional propriety, the local Veterinary Medical Association should assist in projects dealing with lay education and general information. One of the more important officers of the local association should be the publicity director among whose duties should be the promotion in the local press of literature dealing with animal health, enzootic diseases, care of pets, in addition to dispelling misconceptions regarding the profession and its numerous facets.

Speakers relating to animal health and care are continually in demand by local civic and fraternal organizations; requests along these lines should be pursued with zeal and thoughtfully presented by various association members.

The situation often arises within a community wherein a client presents his pet at the office of a particular doctor. If it should happen that he is dissatisfied with the advice or treatment at the given hospital he will, in turn, present his pet at the hospital of a colleague. We are all taught early in our careers to take a thorough and careful history of each case. This should include prior treatment which, by careful and discreet questioning can lead to uncovering a history of previous professional care. Rather than an open and abrupt reappraisal of the situation, the thoughtful practitioner should call for a brief delay until a consultation with the clinician who made the original treatment can be made. A course such as this should serve to heighten the opinion of the client not only for the veterinarian involved, but also for the entire profession.

Independent action and initiative have, to a large degree, been responsible for the growth of veterinary medicine. The day when independent action alone can bring about the desired result is waning, although it will always have its place. In every phase of human endeavor increasing emphasis is being placed on mutual cooperation in order to achieve a desired objective. Certainly this is no less true in veterinary medicine than in any other field. By means of this type of mutual cooperation and trust we can raise the level of achievement in our profession to a new plateau of standards.

We need look no further than our own Veterinarian's Creed for a pattern on which to chart our growth. Let each of us pledge to adhere to its credo; by doing so we cannot fail to reach our goal.

Salmonella

The Salmonella genus was named after the emminent veterinary pathologist, Dr. Daniel E. Salmon (1850-1814), who isolated the prototype organisim, *Salmonella cholerasuis,* from cases of hog cholera in 1885. The genus is now known to infect a wide range of animal hosts and man. The ubiquitous organism prompted the following verse in the British *Lancet*:

An infection found in beavers was transmitted to retrievers
And carelessly contracted by a vet,
While the organism injected in a toad in Timbuktu,
Was recovered from a tadpole in Tibet.

—Kenneth B. Haas, D.V.M.

Blood Banks

Blood Banks for dogs are a distinct possibility in the near future. Dogs have different types of blood, although 40% have the so-called A-negative type, which in a measure corresponds to type "O" universal for humans. If at all possible, dogs should be transfused with a type of blood similar to their own, but in an emergency A-negative type may be used. If the A-negative is a mismatched type usually no harm results, but once a mismatched type has been used the receiver is sensitized so that serious, frequently fatal, anapohylactic shock is likely to occur.—*R. R. Dykstra, D.V.M.*

Although long recognized as an important problem in both human and veterinary medicine, allergic dermatoses still constitute an enigma to the practitioner. Reliable diagnostic tests, permanent cures, and desensitization methods are still lacking. The writer recommends systematic research to help combat these stubborn conditions.

Allergic Dermatoses in Small Animals

F. KRAL, V.M.D., M.V.D., (h.c.) Doc habil.

School of Veterinary Medicine
University of Pennsylvania
Philadelphia, Pennsylvania

THE TERM *allergy* is used frequently to designate various general or localized cutaneous conditions in man and animals. The ramifications involved constitute a relatively new field of study. The terms *allergy* and *hypersensitivity* are often used synonymously, but strictly speaking hypersensitivity is only one phase of allergy.

An allergy is a specifically acquired alteration in the capacity of living tissue to react to an agent. The condition itself results from exposure to an exciting agent, and appears upon reexposure to either the same agent or to one immunologically or chemically related.

These factors may be external in origin or they may originate within the individual.

An allergy or an allergic reaction develops in the body as a result of an adjustment to external or internal factors. Heredity plays an important part, particularly in special breeds of small animals, and therefore constitutes an essential part in the predisposition and development of allergic manifestations.

Any material involved in the formation of environment can cause allergy, regardless of how it finds its way into the body. Inhalation of chemical dust and gases can provide the necessary entrance for allergy producing material. Food, drink, or orally administered medicine absorbed through digestive organs can become allergy inducing agents in both man and animals.

Cutaneous Allergies

Any discussion of allergic dermatoses in small animals must necessarily bring into focus the so called "food allergy."

1. In cats, allergic skin conditions have developed after excessive intake of fresh or canned fish. Milk (particularly cow's milk), eggs, and pork have been recognized as causes of cutaneous allergies in cats. In dogs, an excessive diet of horse meat, either fresh, canned, or frozen, has been a frequent cause of allergic skin reactions. Cow's milk, eggs, rice flower, canned food, especially canned food preserved with benzoic acid, diets containing excessive carbohydrates, potatoes, and tuna fish are other foods that

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cause allergic dermatoses in dogs. High protein diets, particularly when fed to animals suffering from hepatic disfunction (wherein the liver fails to act as a filter of protein) have been the cause of skin disorders in which the allergic condition appeared as the first symptom.

2. Cutaneous allergic manifestations have developed after the administration of various drugs, either when ingested, injected or applied topically. Antibiotics such as penicillin, streptomycin, and aureomycin have been found to be the cause of allergic conditions. Sulfapyridine, sulfadiazine, sulfathiazole and sulfaguanidine have been cited in connection with allergic dermatoses. Arsphenamines, potassium iodine, bromides, phenobarbital, procaine, cod liver oil, all have produced allergic reactions. Even hormones, when administered excessively, especially diethyl stilbesterol, have been recognized as etiological agents that bring on allergic manifestations.

3. Inoculation with distemper serum, vaccines for treatment of dogs with pyogenic dermatitis and transfusion of blood may produce allergic reactions.

4. Chemicals such as excessively chlorinated water used for bathing, disinfectant preparations, soaps (especially cresol soaps), tar soaps used for frequent washing of skin areas, and chemical dusts on certain types of vegetation, all have been identified as causes of topical allergic conditions in dogs and cats.

Lanolin or vaseline used topically may produce the same condition. Wool blankets have also been incriminated. Painted floors, premises, cages and material used for bedding may also cause allergic reactions.

5. The insect induced allergy is one of the most important in small animal medicine, particularly in canine patients. There is a special individual susceptibility of some animals to infestation by various ectoparasites. Some researchers try to explain this phenomenon by noting special blood conditions of some animals. This explanation suggests that some elements beneficial to parasites are available in certain individual cases, or that blood may be deficient in certain elements and thus more desirable to insects. Not less important is skin texture and density of the hair coat. This clinical observation may explain why there are special predilection sites of the body prefered by insects, such as the back, tail, abdomen and areas behind the ears, as it is found, for example, in cases of flea bite allergy.

6. Cutaneous allergic conditions have been observed in the course of infestation by mites. Sarcoptic mites producing scabies and demodectic mange of dogs are examples. Failure to find sarcoptic mites in skin scrapings in the course of notorious scabies, and the quick response to the administration of cortico-steroids when used to treat animals for scabiotic pruritus, is good proof of this type of allergy.

7. Allergic skin conditions have developed after various infections by viruses, bacteria and fungi. Distemper exanthema in dogs is a typical example. Human dermatologists consider the milk's nodules in man as an allergy to cow-pox virus infection. Lymphadenitis aposthematosa in puppies is another example of allergic swellings of the skin due to primary virus and secondary streptococcus infection. Allergic skin conditions have been reported in small and large animals in the course of mycotic and dermatophytic infections. This may explain the failure to find fungus elements when scrapings were taken from suddenly developed skin lesions in the course of notorious ringworm. In such cases suddenly developed "itchiness" has been another symptom of allergy.

8. Cold and heat have also been considered primary causes of allergic conditions. Light is an etiological agent in so called photosensitization, of which Collie nose is a typical example.

Clinical Symptoms of Cutaneous Allergy

Allergic skin manifestations are characterized by the following pathognostic symptoms: (1) swellings of the superficial layer of the skin—this could be as a diffuse edema, as seen in lymphadenitis aposthematosa, or as localized papular edematous infiltration as seen in most allergic skin conditions; (2) redness of the affected area as a typical erythema; and (3) the most

important clinical symptom is allergic pruritus. In some cases this may be the first and the only symptom of allergy.

These symptoms are either limited to a special skin area or found all over the body. As a rule, they appear suddenly, lasting only a limited time, or they may develop in to a long lasting cutaneous condition, frequently associated with a special season of the year. In many allergic dermatoses there is an essential increase of eosinophils.

Histological examination of affected skin reveals dilatation of smaller blood vessels, cellular infiltration, and edema. Cellular infiltration appears as clumping of leukocytes, particularly eosinophiles. Proliferation of epidermal cells causes considerable thickening of the skin.

In advanced cases there is a decrease in cellular infiltration and edema, but fibrosis of the skin starts to develop and prevails as the main clinical symptom.

Clinical diagnosis of cutaneous allergies is sometimes a difficult task. In some cases a good history may give a good indication. Clinical appearance of the skin lesions is in many cases the most important diagnostic sign. Diagnostic tests with allergens have been found reliable only in limited conditions. The most important tests used in veterinary medicine are those employed in the diagnosis of tuberculosis and glanders. Other tests, especially for food and insect allergies, have not been found to be reliable, and therefore require further research. For instance, in human beings, only 20% of food tests have been reported as dependable. Some of them have caused severe and dangerous reactions. The concentration of allergens used is also important to avoid non-specific positive reaction from irritant action.

A new diagnostic method for allegic conditions has been used recently: dried protein allergen and plasma from an allergic patient are mixed with living leukocytes and platelets, either from the patient or from a non-allergic donor, and scrutinized under the microscope. If specific antibodies are present in the plasma of an allergic patient, the polymorpho-nuclear-leukocytes and platelets exhibit toxic effects and cells die within 15 minutes, whereas controls remain actively mobile.

The course of some allergic dermatoses may be acute, sometimes even peracute, lasting only several hours. However, in small animals allergic dermatoses may persist as chronic conditions. Seasonal allergies develop as stubborn skin conditions that improve or completely disappear after the season.

Prognosis should be guarded, particularly in cases in which etiology has not been established or in cases which respond only temporarily and recur when treatment is stopped.

Treatment

Treatment of allergic dermatoses in which the cause is known consists first of removing the offending agent. For instance, elimination of offending foods is frequently followed by prompt healing.

For systemic treatment, administration of adrenal-cortico steroids has been effective in many allergic dermatoses. To support the effect of this therapy, ACTH or autogenous hemotherapy has been followed to stimulate activity of the adrenal cortex.

In allergic dermatoses in which the histamines or histamine-like substances are primarily responsible, antihistamines are effective.

Non-specific protein treatment, such as sterile milk or sterile extracts of fetal tissues, such as Forgan (Jensen-Salsbery) or Placenton (Pitman-Moore), has been in some cases a good supportive treatment.

There are reports of good results in the treatment of allergic dermatoses by administration of calcium salts and arsenical preparations. Change of environment, even hospitalization, has very often helped environmental allergies.

Only soothing remedies should be used for the treatment of animals for allergic dermatoses. Particularly oily preparations and cortisone lotions or ointments have been found to be the basis of good external treatment. *X*-ray treatment is contraindicated for allergic dermatoses.

Human Allergies from Contact with Animals

Allergies developing in persons who come in contact with animals, or who attend

stables or premises where large or small animals are kept, are a continuing problem. Some people are allergic to saliva of horses, dogs, or cats. Others develop severe allergic conditions after inhaling horse dust or straw dust. Cases of serious allergic reaction have been reported in veterinarians examining cattle rectally or vaginally with latent Brucella infection. Similar conditions have developed in veterinarians after rectal examination of cattle grazing on pastures with poison ivy or after examination of dogs that had contacted poison ivy.

Allergic dermatoses are today an important problem in both human and veterinary medicine. More information is needed regarding reliable diagnostic tests. Therapy by which the patient would be cured permanently is still missing. No reliable method of desensitization is now available and much remains unknown concerning prevention of these stubborn conditions.

Only a systematic research program in our hospitals and close cooperation of the client may guide us in our daily practice.

Sylvatic Rabies in Florida

Sylvatic rabies in Florida has been pronounced a hazard to public health by Dr. James McQueen, Communicable Disease Center veterinarian assigned to the Florida State Board of Health. Wild animals serve as an important source of human exposure. In addition, their role as a source of infection for domestic animals should not be underestimated, he said.

Extensive studies on fox rabies have revealed that when fox density reaches the point where animal to animal contact is high, an outbreak of fox rabies can be expected. Epizootics increase and reach a peak, then subside as the fox population becomes too sparse to support epizootic spread.

Since the topography of Florida is such that most of the densely settled areas boarder forests and swamps, many species of wildlife, including foxes, skunks, raccoons and bats have a habitat near dense human population.

In 1957 there were 122 laboratory confirmed cases of rabies in Florida. Half of these occurred in one county as a result of explosive outbreak starting in the fox population and spilling over into the dog population of an urban area. In 1957 laboratory confirmed cases of rabies included the following: 73 foxes, 7 raccoons, 2 skunks, and 7 bats. Table 1 represents cases of rabies confirmed in Florida State Board of Health Central Laboratory from January 1 to August 15, 1958. Cases from five regional laboratories are not included.

Sylvatic rabies may constitute more of a problem than the statistics generally reflect. Data on areas which support a sparse human population, but are well populated with animal carriers, are not as complete as public health officials would like them to be.

TABLE 1

Species	Total Positive	Total Human Beings Exposed	Total Animals Exposed
Fox	9	3	Several dogs & cows
Raccoon	5	None known	4 dogs; 3 cats
Bat	4 (one baby)	2	None known
Skunk	2	2	None known
Dog	11	6	None known
Cat	5 (3 were kittens of 1 litter)	2	None known
Total sylvatic rabies	20	Total human beings exposed	7
Total dog & cat rabies	16	Total human beings exposed	8

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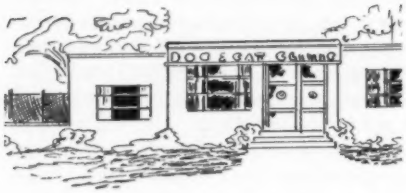

CLIFFORD L. McGINNIS, D.V.M.
Peoria, Illinois

Prolapsed Rectums

I received a late telephone call one evening from a client who excitedly told me her cat had a prolapse of the rectum. I had never seen a rectal prolapse in a cat, but she convinced me and I met her at the hospital. At first glance it appeared to be a prolapse, but turned out to be a night crawler that was clinging to the hair on the hind leg. We have since had two "prolapsed rectums" on three months old kittens.

Mummified Foetus

A Siamese cat that had not eaten for a week was presented at the clinic. By palpation, I finally made a diagnosis of a mummified foetus in one horn of the uterus. Upon invasion of the belly, it developed that the uterus was normal. Then I found a one inch intussusception of the gut with no adhesions present, and this came apart easily. Further exploration revealed a ten inch, necrotic, intussusception, so we threw away a foot of the gut, accomplished an anastomosis and the cat recovered. We also performed a hysterectomy, the next time the patient is presented at the clinic, we will not have to worry about a mummified foetus.

Intussusceptions are peculiar in that they can not be pulled apart; but by squeezing at the forward end, they will slowly unravel. We had one recently on a Bassett puppy with distemper. The animal recovered after surgery but died later from an encephalitis.

Calcinosis Cutis

A Chihuahua was presented with two narrow, elevated, red ridges extending from in front of the prepuce, back to coalesce in the perineal area. Prednisolone was administered and a palliative was dispensed. Two weeks later when again presented, affected areas were wider and more inflammed. After trying a variety of drugs for the next month with no results, we submitted a biopsy specimen to the pathologist at the Methodist Hospital. He diagnosed it as Calcinosis Cutis and his report follows.

"Sections of the skin reveal moderate acanthotic thickening of the squamous epithelium. The underlying corium shows hair follicles in which there is hyperkeratosis with disruption of the follicles and extension of keratinous debris with resultant foreign body reaction. There is rather extensive deposition of calcium salts. The appearance indicates that there is a hyperkeratosis of possible trophic origin. There is no evidence of neoplastic disease."

This entity is seldom observed in clinical human medicine, and constituted my first experience with it in veterinary medicine, so I consulted a dermatologist. His advice was to excise the lesions surgically. By this time they were raw and covered with a hard, yellow, chitinous material. It was too extensive for one surgical exercise so we removed part ot it, waited two weeks, and removed the rest. The skin was healing nicely but one night the dog seemed to develop respiratory distress. About midnight, the owners took it to a colleague for euthanasia because they did not want to disturb me. That's the kind of client I like.

Pet Bird Problem

Male birds occasionally develop a disease called brown hypertrophy of the cere and may then be confused with females. If this is the worst problem I ever have with birds, I'll be grateful.

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Editorial

RESEARCH IN VETERINARY PRACTICE

The impact of organized scientific investigation on veterinary medicine has been great since World War II. This influence is clearly reflected in our literature. Today every veterinarian has received training in the processes of methodical observation and has had some basic experience in the principles of scientific investigation. Increasing reliance on scientific experimentation reveals a healthy appreciation of a modern profession for the contributions of specially trained scientists. On the other hand, if this recognition should influence a majority of practitioners to rely solely on ready made evaluations, a major professional strength, independent practitioner investigation, would undergo atrophy of disuse.

Sound progress requires the contributions of a total profession. With improving educational standards, the flow of well documented case reports, unusual clinical findings and published practitioner opinions on common field problems should be growing in quality and quantity.

There should be no reluctance or lack of confidence on the part of practitioners in reporting findings and observations. The trained scientist is an avid fan of the practicing veterinarian. Hungry for clinical guidance that can help improve and evaluate controlled experimentation, the scientist looks to his practicing colleague for the ideas and encouragement that will make his work more fruitful.

With this objective in mind, VETERINARY MEDICINE is continuing it's traditional search for practitioner reports with increasing vigor. We must have the seasoning of practice to fully assimilate the meat of modern scientific investigation.

The following comments by Drs. A. G. Foraker and S. W. Denham come to us out of *Obstetrics and Gynecology* by way of *Medical News*. They echo a parallel concern in human medicine.

The average practicing physician tends to view research as an esoteric rite, carried out by professors in medical schools or large institutes. They are assisted by cohorts of acolyte-research fellows, Ph.D.'s, and pretty girls in white smocks (who probably do most of the work). From time to time, the professor produces a long dull paper, full of elaborate tables and graphs, measuring the relationship of certain ions to certain membranes. For example, recently a group of physiologists reported that comatose cats are less likely to show conditioned reflexes than aroused cats.

Practitioners exhibit their own conditioned reflex to such papers. They pass quickly to the next practical discussion concerning the management of thrombosed hemorrhoids in pregnancy. Many have had some research experience during their training. However, now being out in the "boondocks" of private practice, they are disinclined to attempt ambitious research.

In many instances in the past, no opportunty for research existed. Maybe many good research ideas have withered on the vine. It is all to easy to say, "I'll bet the

serum rhubarb is significantly raised in Skronk's disease. But I can't work on this idea here in the Podunk General Hospital."

Yet, research is definitely possible in non-university hospitals. Since 1955, we have been attempting to carry on and to expand a program of investigation into cervical carcinoma (Baptist Memorial Hospital, Jacksonville, Florida). No unusual merit is claimed for these accomplishments. But they do show that the times are favorable for research in non-university environment. Physicians, in general, will welcome research as an added educational function in the community. Hospitals are more likely to lend support or approval.

Obviously, colossal studies requiring tightly organized groups of scientists of different training, using massive equipment, are totally beyond reach. However, physicians in non-university surroundings have closer and more prolonged contact with individual patients and their problems than do most academicians. This may, in modest fashion, produce lineal descendants of such practitioner-researchers as Beaumont or Sims.

Fish for the Laboratory

A report on Fishes as Laboratory Animals was prepared by Myron Gordon of the New York Zoological Society, and is presented in a book on laboratory animals.* It is the longest chapter in the book, containing more than 100 pages, including 23 pages of references, and apparently tells everything about fish except how to get them to bite.

The use of several species of fish is standard practice in many biological laboratories. The author claims for them these advantages: they require little space and inexpensive housing; of all vertebrate animals, fish are the easiest and cheapest to breed and maintain; and they are the cleanest and least odoriferous of laboratory animals. Because they are largely diurnal, their whole life cycle can be observed easily. Inbred lines are available. Some (platyfish, sword tails, guppies, mollies) are viviparous and breed all the year around.

The author gives much attention to aquarium water, the temperature, the amount of light, avoidance of metals (iron, nickel, cadmium, etc.), and insecticides (DDT) in solution and the elimination of chlorine from tap water when it is used in aquaria. Of the sensitivity of some fish to metals, he states that one part of silver nitrate in 22,500,000 parts of water will kill fingerling salmon exposed to it for 48 hours, and one part of the metal to 300 million parts of water is promptly fatal to stickelbacks. Copper, chromium, and zinc are also extremely toxic.

The importance of aquarium plants is stressed; at the same time the author disclaims the popular belief that plants in an aquarium benefit the fish by giving off oxygen and absorbing carbon dioxide. "The so called balanced aquarium is a myth." Plants in aquaria constitute a depository for scattered eggs both of the adhesive and nonadhesive types; supply sanctuary for the fry, provide shade, purify the water by using the fertilizer which collects from excretions of the fish and unconsumed portions of the feed and to a limited degree give warning of the accumulation of toxic substances in the water.

The author regards commercial feeds, which are inexpensive and readily available, as satisfactory for aquarium fish. For those who wish to prepare the feed themselves, he gives a few formulas; chiefly liver and cereals, and directions for raising live feed—Daphnia (waterfleas), white worms, and tubificid worms.

Upon their reproductive characteristics oviparous fish are classified into: egg scatterers, bubble nest builders, and mouth breeders. Viviparous types include fish which bear all their young within a few hours or minutes and those which give birth to a small number of living young daily for several days.

*The Care and Breeding of Laboratory Animals, edited by Edmond J. Farris. John Wiley & Sons, Inc., New York, New York.

Animal Health

R. R. DYKSTRA, D.V.M.

Estrus in Cattle

Still another indicator of estrus in cattle as reported by Alliston, Patterson and Ulberg of the Mississippi Agricultural Experiment Station is the pattern of crystallization of cervical mucus at the time of irritation and for two or three days before and after this event. The mucus must be from the cervix, and obtained through suction by means of a plastic tube (such as used during insemination) and a rubber bulb combined with rectal manipulations. The mucus is spread entirely on a clean glass slide, and dried at a low temperature over an alcohol burner. Temperature must be kept below the point of bubbling or boiling of the specimen. The pattern of crystallization that becomes evident about 3.5 days before estrus, and continues for approximately a similar postestrus period, is fernlike. If mucus is smeared over the entire surface of the slide, only long "ferns" are observed. Otherwise crystallization is not typical or complete. It is stated that the fern-like crystallization of the cervical mucus during the comparatively short period preceding, during, and after irritation may be accounted for by the presence of chloride (NaCl), and also by a more fluid state of the mucus which is favorable for the passage of sperm.

Ataraxics in Veterinary Practice

Since animals do not become habituated to the use of certain drugs such as the ataraxics, it is safe to administer them to animals suffering from stress. Under this classification in the small animal field is the excitement incidental to parturition; the fear occasioned by loud noises such thunder, firecrackers, gun fire; the discomfort of mild pruritius; and in large animals preliminary to general anaesthesia. Properly used under supervision by a veterinarian, these agents have a decided place in practice.

Vesicular Stomatitis

Vesicular stomatitis of swine is still largely a sanitary prophylactic problem, *i.e.* isolation, quarantine and cooking of garbage. When garbage is a part of the ration, vaccination is of doubtful practical value.

A crystal violet vaccine of chick embryo origin inactivated by heating and a chemical agent gave protection for only one to three months against challenge doses of virus in recent experiments. On the other hand, when a heat inactivated vaccine was used, immunity was of a lower grade. When used as a repeat or second vaccination, it lengthened the duration of the immunity.

Preservation of Dressed Poultry

Antibiotics used for perservation of dressed poultry (usually chlortetracycline) will prevent spoilage for approximately three weeks. After this period the spoiled meat is contaminated with a variety of fungi and molds, and by resistant organisms that have not been demonstrated on spoiled poultry not using chlortetracycline. One of the yeasts identified (*Candida parapsilosis*) is said to be a potential pathogen, and there could be a build-up of it on processing plant equipment. This observation suggests that the strictest sanitation must be required with the use of antibiotics for lengthened shelf-life of ready-to-cook poultry.

Leptospirosis

From Wisconsin it is reported that leptospirosis (*Leptospira pomona* infection) is one of that states's most important bovine ailments. Serologically, presence of the disease is also being recognized in swine and native deer.

Practitioner's Laboratory

W. L. SIPPEL, V.M.D., Ph.D.

Florida Livestock Board
Kissimmee, Florida

Clot Retraction Test

Last month two simple methods of determining the clotting time of the blood were discussed. It was suggested that if a prolonged clotting time was detected, tests should be performed to ascertain what step of the clotting mechanism is involved.

One such test is the clot retraction test, which is a rough, qualitative type of test for the number of platelets in the blood. An actual platelet count is a more precise test but also more tedious to perform. The clot retraction test is also useful in confirming a diagnosis of bracken fern poisoning in which condition there is a deficiency of platelets.[1]

Materials

Clean, dry test tube; cork; bent wire loop; blood for test; normal control blood; 37 C. incubator.

Procedure

1. Fill a tube with the blood to be tested.
2. Cork the tube with a cork through which extends a wire with a hook at the bottom. (Fig. 1.)
3. Fill tube with blood to be tested to point below cork and mark upper limit on tube.
4. Duplicate with blood from a normal control animal. Do not place corks in tubes firmly. Removing them will disturb the clot.
5. Place both tubes in 37 C. incubator for two hours.
6. Carefully dislodge cork and gently withdraw the wire.

Interpretation

In cases with a very low platelet count, the soft clot will not adhere to the wire. Rather the wire will simply come out leaving the blood in the tube. In normal animals, the clot will adhere to the wire and be removed from the tube, leaving the expressed serum behind. The amount of serum remaining should be measured with a ruler on the side of the tube. Normal animals will have 40 to 70% of the original volume as serum. Values below 40% serum are considered abnormally low and indicative of a reduced number of platelets.

In addition to bracken fern poisoning, other conditions producing reduced numbers of platelets are aplastic anemia (trichlorethylene extracted soybean oil meal

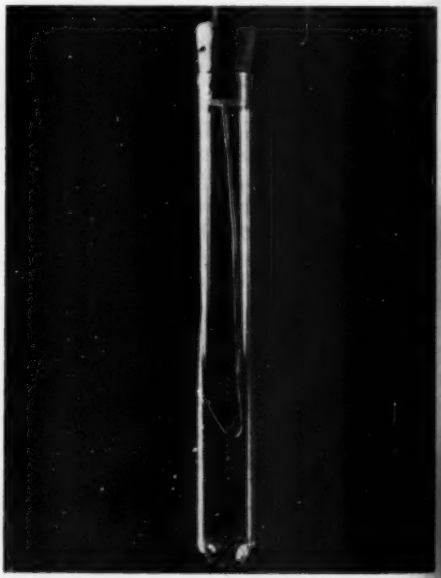

Fig. 1. Bent wire in test tube for clot retraction test.

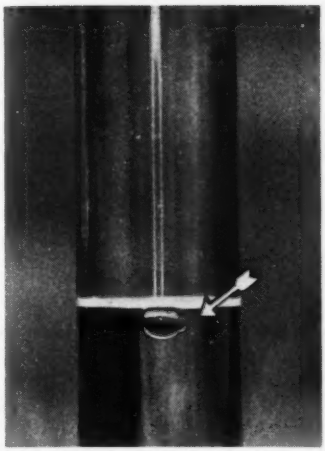

Fig. 2. Hirschboeck's clot retraction test. Note drop of blood in castor oil. Arrow indicates exuded serum as evidence of clot retraction.

poisoning, among others), some cases of leukemia and advanced liver disease.

An alternative method is described by Hirschboeck[2] whereby 2.0 c.c. of blood is withdrawn from a skin puncture into a Sahli hemoglobinometer pipette. This is carefully "planted" onto the surface of castor oil (U.S.P.) in a test tube where it will remain attached to the surface. The tube is held at room temperature. Retraction is indicated by dimpling of the surface of the oil and extruding of a serum droplet. (Fig. 2.) Normal time for humans is 33 minutes. Fifty minutes or over is prolonged.

Milk Fever Test

Although Best and Taylor[3] indicate low serum calcium is never a factor in hemorrhagic disease in humans, a simple test for serum calcium can be mentioned in relation to blood coagulation and as a confirmatory test for milk fever.

0.5 ml. of 20% calcium borogluconate is placed in tube one. 5.0 ml. of whole blood is placed in this and a second tube. If tube one clots (determined by gently tilting the tubes) appreciably sooner than tube two, it is said to be indicative of a lowered serum calcium. The author has had no experience with this test in milk fever and would like to hear from practitioners who have tried it.

REFERENCES

1. Naftalin, J. M. and Cushnie, G. H., Pathology of Bracken Poisoning in Cattle. *Jour. Comp. Path. & Therap.*, 64:54, 1954.

2. Hirschboeck, I. S., The Effect of Operation and Illness on Clot Retraction: Description of a new method. *Jour. Lab. & Clin. Med.*, 33:347, 1948.

3. Best, C. H. and Taylor, N. B., The Physiological Basis of Medical Practise. The Williams & Wilkins Co., Baltimore, Md., 1950.

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The Veterinary Medical Associations of Iowa, Kansas, Missouri, and Nebraska, are joining with Midwest Feed Manufacturers' Association of Kansas City to present the first area-wide nutrition conference planned especially for the veterinarian. This Midwest Veterinarian-Nutrition Conference will be held at the President Hotel in Kansas City, Missouri, on December 8 and 9. All veterinarians are invited to attend.

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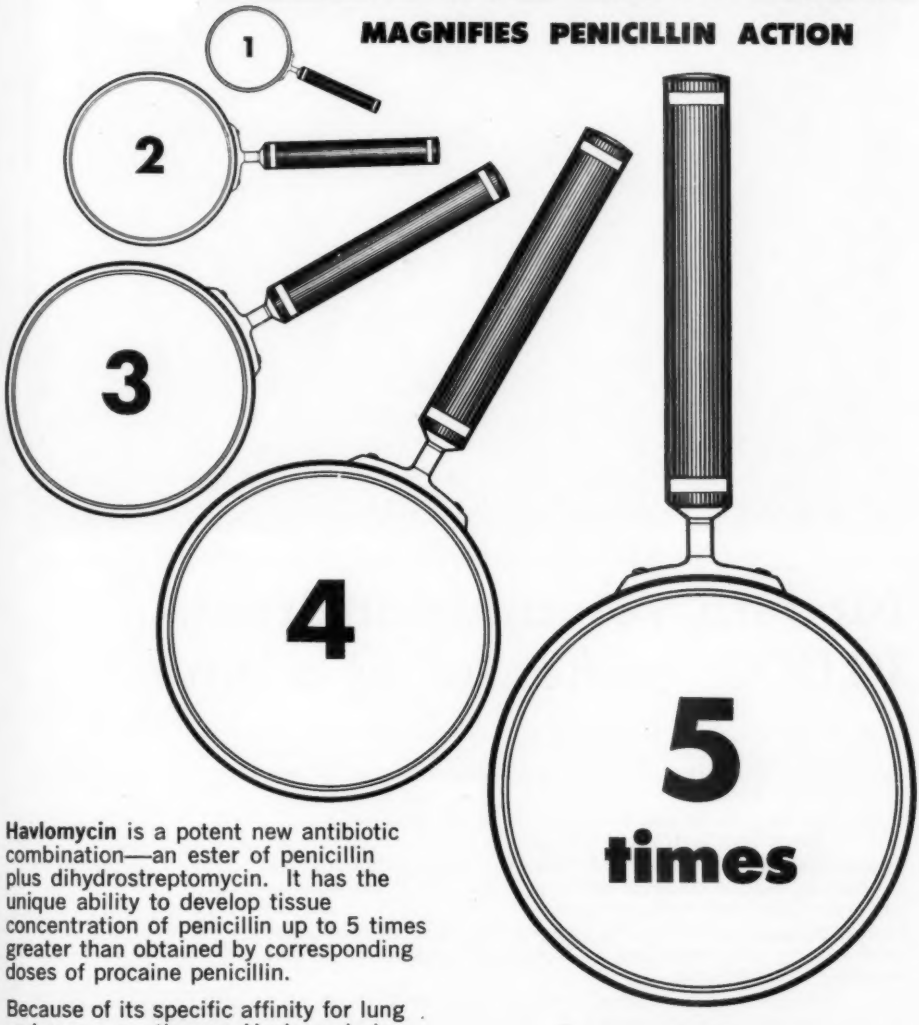

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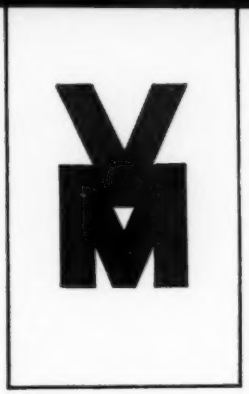

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Kenneth G. Coolidge

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Jones Named to Pfizer Post

Dr. Hilmer L. Jones has been named veterinary medical director of Pfizer Laboratories, according to announcement by the

Dr. Hilmer L. Jones

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Reader's Service

Swine Management Practices are illustrated in a new color, sound movie entitled Our Country. It covers breeding, feeding, management, and sanitation, and clearly demonstrates many new swine production methods. It is available for showing to farm audiences. The film can be borrowed without charge from the American Cyanamid Co., 30 Rockefeller Plaza, New York 20, N. Y.

A New Organic Chemical eliminates odors and keeps surroundings sanitary is called Stop, and is recommended by the manufacturers for use in wards, kennels, drainage systems, etc. The product is inexpensive. For information check with Associated Specialties Co., 24555 West Eight Mile Road, Detroit 19, Mich.

Pipe Line Milkers are explained in a new folder available free to those who write. Manufacturers recommend this information to veterinarians who are increasingly becoming interested in trends to fewer herds, bigger herds, and modern milking equipment. Veterinarians and clients can ask Babson Bros. Co., 2843 West 19th St., Chicago 23, Illinois for the folder.

A Bacteriostatic Finish for Textiles (Eversan—Ions Exchange and Chemical Corp.) that remains effective for up to 50 washings is now being marketed, and meets the demand for a "purifying" finish that can resist laundering. It can be applied to cotton, wool, and synthetic fabrics. This finish inhibits the growth of odor-forming and perspiration decomposing microbes and a broad spectrum of other bacteria by fixing a bactericidal metal atom with the cellulosic or keratinic molecule of the textile's fibers. For details on the compounds involved and licenses for use, ask Ions Exchange and Chemical Corp., 48 Leonard St., New York 13, New York.

A Microcrystalline Aqueous Suspension of prednisolone trimethylacetate (Ultracortenol—Ciba) is now available to the veterinary profession. The product is indicated for ketosis and the downer cow syndrome in milk cattle. Other indications are nonspecific dermatitis and inflammatory conditions involving joints and accessory structures and inflammatory conditions of other organs. For details check with Ciba Pharmaceutical Products, Inc., 556 Morris Ave., Summit, New Jersey.

Immunization Information for International Travel is a booklet available from the Government Printing Office, Washington 25, D. C. at 30 cents a copy.

Rapid **Sterilization with Standard Gas Equipment** has made it possible to introduce photographic equipment into the sterile surgical zone and take close-up pictures never before possible. Proximity to the photographic field makes elimination of supplementary lighting possible. Details on this new application are available from Wilmot Castle Co., 1024 Henrietta Road, Rochester, New York.

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Dr. Allen Wolff

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3. Cows more than ten years of age declined rapidly in breeding performance.

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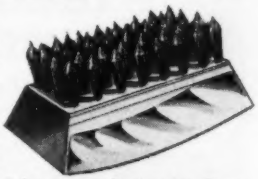

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A News Comment item in the October issue of VETERINARY MEDICINE, quoted University of Illinois scientists as saying, "We believe the side effects of the implants — such as increased excitement, lowered carcass quality, and danger of prolapses — to be too severe to recommend their use."

The statement was accurately presented but further investigation shows that the comment applied *only to replacement heifers.* The report further stated that implantation of market heifers with stilbestrol and similar implants are indicated. Increase in gain can be expected, particularly when fed high-grain rations. The percentage of gain will not be as great as with steers.

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FURACIN has been shown to be strikingly effective in controlling mastitis under field conditions.[1,2] Of 7,123 lactating cows with acute mastitis, fair to excellent results were obtained in 5,597 (78%). Of 3,418 dry cows which had had mastitis during their previous lactating period, fair to excellent results were obtained in 3,104 (90%).

SUPPLIED A water-miscible liquid of FURACIN 0.2% in polyethylene glycol and water. Single-dose SQUEEJET disposable dispenser of 30 cc. Still available, bottles of 500 cc. with rubber stopper and 1 gal.

1. Mires, M. H., and Chadwick, R. H.: Vet. News **10**:3 (Jan.-Feb.) 1947. 2. Mires, M. H.: J. Am. Vet. M. Ass. **117**:49 (July) 1950.

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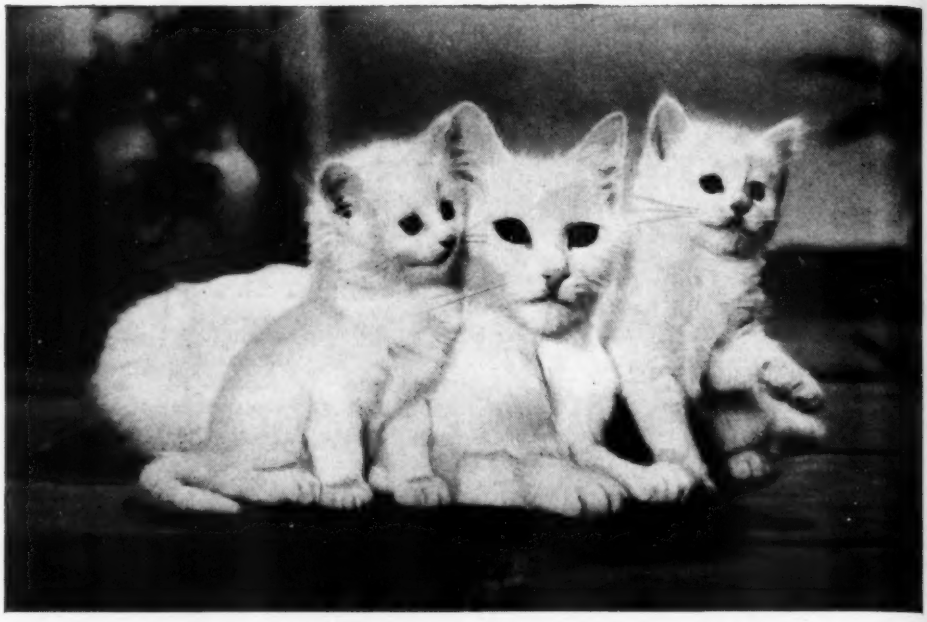


Cats quickly respond to Puss 'n Boots

in energy... disposition... good appearance

A balanced whole-fish formula means livelier, lovelier pets.

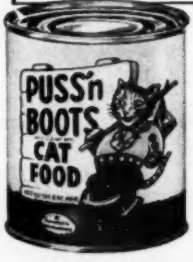
Your cat-owner clientele will be delighted at the improvement in their pets' spirit and appearance when you recommend a regular diet of whole-fish Puss 'n Boots Cat Food. It supplies essential nutrients cats and kittens of all ages are known to need; makes dietary supplements unnecessary.

The natural life balance of whole fish—as the chart shows—is what makes today's Puss 'n Boots so nourishing. Calcium for sound teeth and strong bones, proteins for strength and energy, and vitamins and minerals for all-round health. Selected choice cereals are added for regularity, plus a bonus of vitamins B_1 and E.

It has been the experience of most veterinarians prescribing Puss 'n Boots that the owner sees definite improvement in 3 weeks or less.

How the Natural Life Balance of WHOLE FISH Is Retained in Puss 'n Boots

Bone Structure, for valuable calcium and phosphorus. **Liver and Glands,** for minerals, oils and vitamins. **Costly Fillets,** rich in essential high-quality proteins.



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PUSS 'n BOOTS

Fine quality makes it America's largest selling cat food.

Coast Fisheries Division of The Quaker Oats Company, Chicago 54, Illinois.

Veterinary Calendar

Dec. 3- 5. **Nebraska State Veterinary Medical Association,** annual meeting. Hotel Cornhusker, Lincoln, Nebraska. Dr. L. K. Otto, Arlington, Nebraska, program chairman.

Dec. 3- 5. **Animal Care Panel,** Hamilton Hotel, Chicago, Ill. Ralph A. Rohweder, 920 South Michigan Blvd., executive secretary.

Jan. 7- 9. **New York State Veterinary College,** Cornell, 51st annual conference for veterinarians. Cornell University, Ithaca, New York. W. A. Hagan, dean.

Jan. 13-15. **Kansas Veterinary Medical Association,** 55th annual convention. Hotel Broadview, Wichita, Kansas. Dr. K. Maynard Curts, 5236 Delmar Ave., Kansas City 3, Kansas.

Jan. 14-16. **Indiana Veterinary Medical Association.** Hotel Severin, Indianapolis, Ind. Dr. L. M. Borst, 3315 Shelby Street, Indianapolis, Ind., secretary.

Jan. 21-22. **Michigan State University,** 36th annual postgraduate conference for Veterinarians. College of Veterinary Medicine, Michigan State University, East Lansing, Mich. Dr. W. W. Armistead, dean.

Jan. 26-28. **Minnesota State Veterinary Medical Society,** annual meeting. Leamington Hotel, Minneapolis, Minn. Dr. B. S. Pomeroy, secretary-treasurer.

Jan. 27-28. **Maryland State Veterinary Medical Association.** Winter Meeting. Emerson Hotel, Baltimore, Maryland. Dr. Harry L. Schultz Jr., Baltimore, Md., secretary.

Feb. 2- 4. **California Veterinary Medical Association,** annual Midwinter Conference. School of Veterinary Medicine, University of California, Davis.

Feb. 16-18. **Illinois State Veterinary Medical Association,** annual meeting. LaSalle Hotel, Chicago, Ill. Dr. C. B. Hostetler, 1385 Whitcomb Avenue, Des Plaines, Ill., executive secretary.

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CASE NO. 7 Careful radiographic analysis of ventro-dorsal projection of the pelvis reveals necrosis and flattening of left femoral head. Osteoarthritis and filling of left acetabulum. Subluxation of left femoral head and coxa magna. Diagnosis: coxa plana (Legg-Perthes disease) with secondary osteoarthritis of left coxofemoral joint.

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continued from inside front cover, small animal section

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Florida Veterinarian of the Year

The Florida State Veterinary Medical Association named Dr. E. Fred Thomas of Sarasota, as the Veterinarian of the Year during its recent meeting at Ft. Lauderdale.

Doctor Thomas began his veterinary career in Florida in 1927 when he was employed by the Department of Veterinary Science, University of Florida in Gainesville as pathologist. In 1933 he resigned that position to engage in the practice of his chosen profession in Ocala, Florida

In 1949 he accepted the position as Head of Clinical Veterinary Medicine in that institution, and rendered valuable service as a veterinary clinician. Later he resigned from the faculty of the University of Georgia and returned to Florida in 1952 where he began practicing in Jacksonville. In 1953 he moved to Sarasota and opened the Thomas Animal Hospital.

Doctor Thomas is past president of the Florida State Veterinary Medical Association, a member of the Southern Veterinary Medical Association, the American Veterinary Medical Association, and the American Animal Hospital Association.

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the ONLY magnet which offers ALL these advantages!

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- Full 3 in. by ½ in. size—will attract over 3 lbs. of iron
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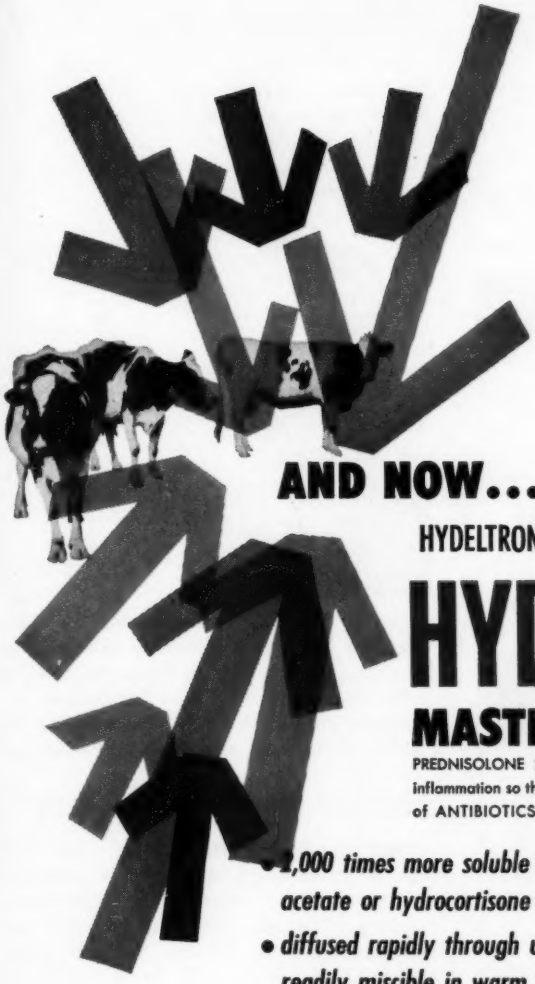

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PREDNISOLONE 21-PHOSPHATE* to suppress acute inflammation so that a BROAD-SPECTRUM combination of ANTIBIOTICS can get to the site of infection!

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- *diffused rapidly through udder tissue... readily miscible in warm milk*
- *aids in suppressing acute inflammation*

HYDELTRONE MASTITIS OINTMENT CHECKS INFLAMMATION
CONTROLS INFECTION—HELPS GET COWS BACK ON FULL MILK PRODUCTION—*FASTER!*

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PROCAINE PENICILLIN	100,000 UNITS
DIHYDROSTREPTOMYCIN (AS THE SULFATE)	100 MG.
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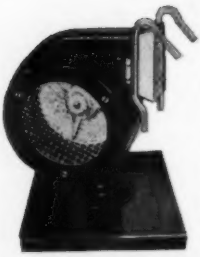

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Powerful and rugged three-heat hot air blower. Delivers 140 cubic feet of either hot, warm, or cold air per minute.

Not heavy or bulky. Will hang anywhere on the cage or may be used any place with the small stand applied. A time saver for professional dog grooming and bathing.

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Indian Veterinarian Visits U. S.

Dr. Shripad G. Dixit, Bombay, India, has spent several months in the United States studying mass production methods of various vaccines and serums. During the last two months he visited at Diamond Laboratories, Des Moines, Iowa.

Dr. Shripad G. Dixit

Doctor Dixit is superintendent of Virus Vaccines Biological Production Station in Bombay. His visit to the United States was under the auspices of the International Cooperative Administration, a program for exchange of students, educators and scientists.

Smith and Hay Resign at K-State

Two members of the Kansas State College department of surgery and medicine are resigning to enter general veterinary practice at Ottawa. Dr. Jean G. Smith has resigned, effective October 31. The resignation of Dr. William H. Hay is effective November 30. Both men are assistant professors in the veterinary school.

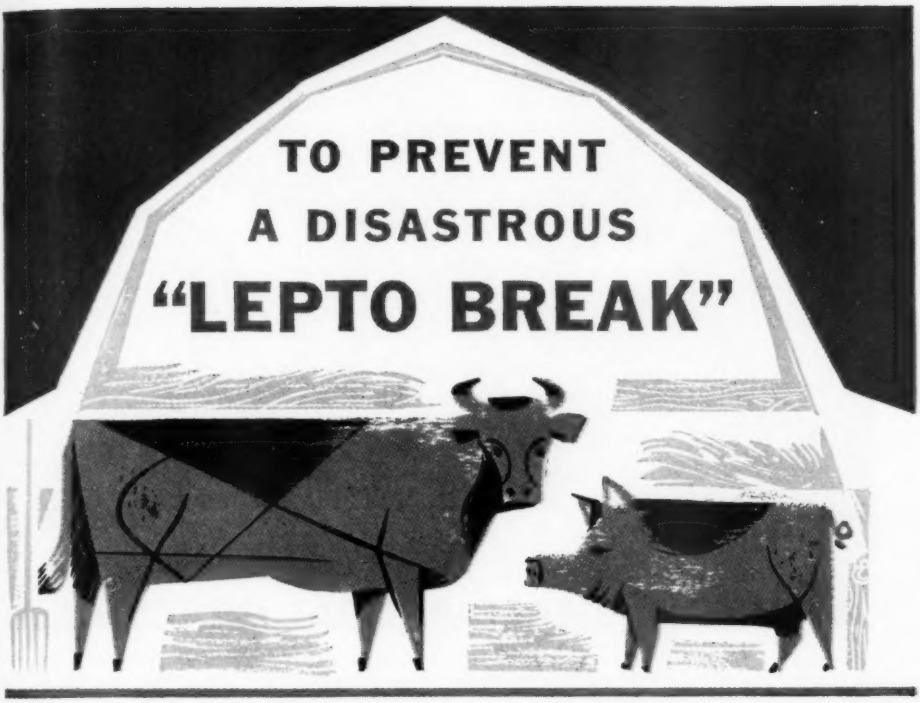
D.V.M. BOOT

In producing the "D.V.M. Boot" the manufacturer has furnished both foot and leg emergency protection from elements familiar to the large animal practitioner. These feather-weight boots really save the veterinarian's time since they slip right on over his street shoes. Removal too, is quick and easy, and they roll up compactly and fit into a tiny pocket size pouch. Each boot weighs only seven ounces. They are long lasting and as tough as mule hide because the material is Live Gum Rubber. The sole and heel material is slip proof and is made of genuine Dupont Neoprene. D.V.M. Boots have become a standard part of Veterinary obstetrical apparel. In ordering state size of your street shoes. Color Black only.

VM-75 D.V.M. Boots **$4.50**

In sizes 8-11 only.

Detroit Veterinary Supply Co.
Detroit 32, Michigan



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Leptospira pomona bacterin ARMOUR

Protects against deaths, abortions, milk and meat production losses, due to leptospirosis in swine and cattle.

• stimulates active immunity • controls spread of leptospirosis

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Injected subcutaneously in 5 cc. doses—with booster dose of 5 cc. recommended at 6-month intervals.

Available in 25 cc. (5 dose), 50 cc. (10 dose), and 100 cc. (20 dose) vials.

Sold only to licensed veterinarians.

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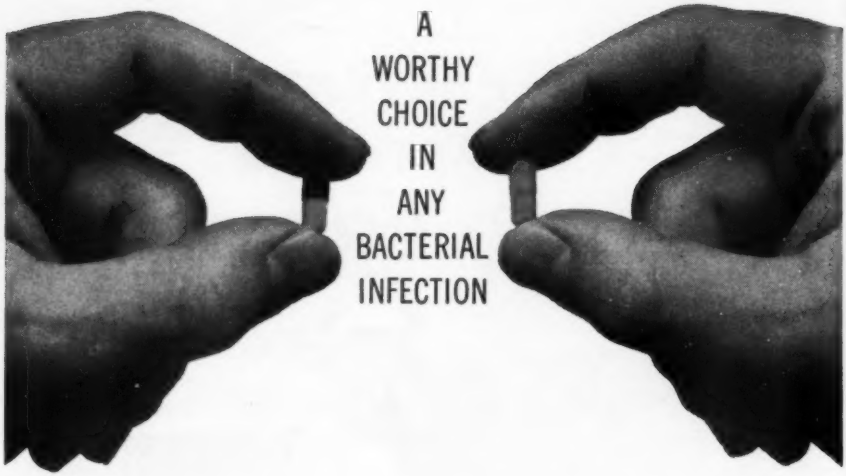

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The logical addition of Delta-Cortef† to Albaplex assures maximum antibacterial, anti-inflammatory support in most potentially serious canine and feline infections complicated by stressful situations.

Each capsule contains Panmycin† Phosphate Complex equivalent to 60 mg. of tetracycline hydrochloride, 60 mg. of Albamycin† (as novobiocin sodium) and 1.5 mg. of Delta-Cortef (prednisolone).

in bacterial infection

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When in your opinion stress is not a complicating factor, the prompt use of Albaplex in those persistent infections provides effective, broad-spectrum antibacterial coverage against both gram-positive and gram-negative pathogens including those troublesome micrococci.

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ALBAPLEX and DELTA-ALBAPLEX are both recommended in a wide variety of infections of the skin, respiratory, urinary and gastrointestinal tracts.

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As pre-anesthetic medication...

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1. Charles Raker, V.M.D., Professor of Veterinary Surgery, University of Pennsylvania. Annual Meeting of the American Veterinary Medical Association, Aug. 18-21, 1958, Philadelphia, Pennsylvania.

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AVAILABLE:
TABLETS: 25, 50, 100 mg., vials of 50.
INJECTION: 50 mg. per cc., vials of 10 and 30 cc.

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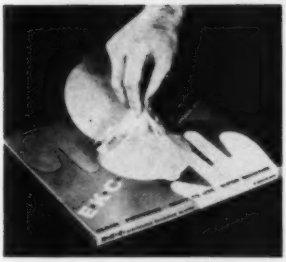

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Examining Gloves
MADE OF STRONG POLYETHYLENE USE ONCE AND DISCARD
*just lift dispenser lid
*remove single glove
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Medium Size fits 6½, 7, 7½
Large Size fits 8, 8½, 9
144 gloves per box
$7.20 per box.

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California Receives Research Funds

The University of California School of Veterinary Medicine has accepted a grant-in-aid from American Cyanamid Company to study the effect of the antibiotic, Aureomycin chlortetracycline, on several economically important diseases of sheep and cattle under irrigated and native pasture conditions.

The studies, which will be conducted under the supervision of Dr. Blaine McGowan, will stress efforts to control shipping fever pneumonia of feeder lambs. The effectiveness of the antibiotic as a control of this common disease problem will be tested in pellet and injectible forms, and may also be incorporated with ground salt.

The research group also plans to determine whether Aureomycin fed at low levels in winter feed supplements will prevent pneumonia and scours of calves in high mountain areas.

Also included under the grant will be a basic study of the nature and cause of urinary calculi (bladder stones), a very important cause of losses in sheep.

Anaplasmosis

Experimental results indicate that the antibiotic Aureomycin (American Cyanamid) in the form of Aurofac (American Cyanamid) in doses of five mg. per pound of live weight fed orally and continued for 30 days or more will result in overcoming the carrier state of anaplasmosis in cattle. The report is from the Department of Veterinary Medicine, Kansas Agricultural Experiment Station.

Anaplasmosis has been reported frequently during the past several years, with important epizootics in California.

Experiments will probably continue at several experiment stations.

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LOW PRICES!
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The dangerous, disconcerting interruption in surgery can make the difference between success and failure for the veterinarian—life or death to the patient. And it's an extremely rare occurrence with a reliable, safe anesthetic like

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NEMBUTAL®

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Practicing veterinarians over a quarter century have learned to depend on the uniformity and purity of this short-acting anesthetic. When you use it, Doctor, you'll find—

Onset of action is prompt—surgical hypnosis being achieved in just 3 to 5 minutes from a single intravenous dose.

Degree of cerebral depression and duration of anesthesia are easily controlled, lasting from 45 to 90 minutes.

Optimal skeletal muscle relaxation accompanying NEMBUTAL anesthesia facilitates surgery; interruptions during procedures are rare.

Side effects are minimal with safe, easy-to-use NEMBUTAL; and there is little danger of cumulative effect with this short-acting agent.

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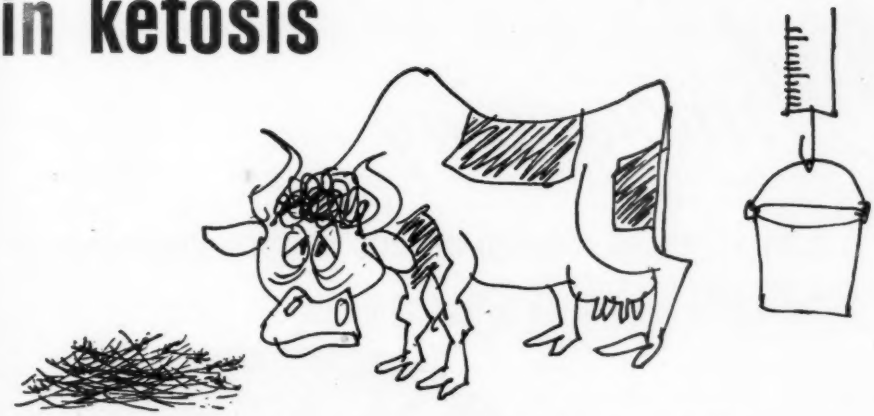

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STERANE

BRAND OF PREDNISOLONE

to put her back on feed and restore milk volume faster

STERANE—for an early return to milk production.

STERANE, three to five times more potent than hydrocortisone and cortisone, stimulates glucose formation and helps re-establish physiological equilibrium. In clinical studies a single intramuscular injection of *50* to *100* mg. of Sterane promptly restored energy metabolism, with rapid reversal of ketotic symptoms in over 83 per cent of 299 cases treated.

STERANE INTRAMUSCULAR-VETERINARY *Sold to veterinarians only*

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Department of Veterinary Medicine, PFIZER LABORATORIES, *Division, Chas. Pfizer & Co., Inc.*, Brooklyn 6, N. Y.

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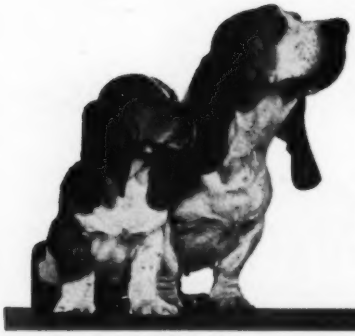
...an advanced vitamin-mineral dietary supplement—with taste appeal to small animals

This new dietary supplement contains nineteen important ingredients in a meat-flavored tablet. Small animals like it!



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- Balances the daily ration.
- Speeds recovery from illness.
- Shortens convalescence after surgery.
- Eliminates complicated additions to rations.
- Maintains health and vigor in older animals.
- Aids growth in young animals.

Dosage: One Pet - Tab daily.

Supplied: In bottles of 50. To veterinarians only.

Send for literature and trial supply.

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Veterinary Division

Bristol, Tennessee

Deaths of Veterinarians

EDWIN B. ACKERMAN, AVC '91, 89, at Huntington, L. I., New York, recently.
FRED S. BALLARD, ISC '11, at Ashton, Iowa, May 26, 1958.
VICTOR BALLOU, UP '16, 72, at Lancaster, Pa., Aug. 3, 1958.
NORMAN G. BEAVER, ONT '14, 74, Manotick, Ont., April 23, 1958.
ALBERT A. BIEBEL, CVC '05, 86, at Austin, Texas, July 11, 1958.
EDWARD A. BRUCE, ONT '05, 73, Sidney, B. C., April 27, 1958.
LAWRENCE G. CLARK, KCV '07, 75, at Los Angeles, Calif., Aug. 10, 1958.
WILLIAM L. COLEMAN, CVC '19, 76, at Albany, Ill., June 22, 1958.
EGBERT S. CONKLIN, MSC '40, 43, at Emery, So. Dak., Aug. 17, 1958.
BENJAMIN F. CORBIN, OSU '35, 59, at Culver City, Calif., June 1, 1958.
HARMON C. DEANE, COR '12, at Ithaca, New York, recently.
MURRAY J. DILLS, IND '22, 63, Decatur, Ill., June 15, 1958.
F. J. DOUGLASS SR., IND '06, 88, at New Orleans, La., July 8, 1958.
HOWARD A. DOWNEY, KCV '18, 67, at Appleton, Wisc., June 8, 1958.
ARTHUR E. FABIAN, CVC '08, at Lake Geneva, Wisc., Jan. 31, 1958.
ARTHUR J. FORSYTH, COR '12, 65, at Walton, New York, Feb. 22, 1958.
DONALD B. FRASER, ONT '03, 76, at Port Arthur, Ont., March 12, 1958.
SAMUEL F. GRIESEMER, UP '09, 70, at Womelsdorf, Pa., June 20, 1958.
CHESTER W. GRIZZELL, KSC '09, 74, Macksville, Kans., May 12, 1958.
ROBERT GYSEL, CVC '93, 90, at Chicago, Ill., Aug. 6, 1958.
ROY C. HARTMAN, COR '14, 69, at Pulaski, New York, recently.
JULIUS W. HERBOTT, UP '12, 68, at Philadelphia, Pa., June 9, 1958.
R. J. HIGHT, CVC '07, 73, at Phoenix, Ariz., recently.
LEO C. HOLBROOK, TEX '44, 38, at San Antonio, Texas, July 2, 1958.
SIDNEY HOLMES, MCK '14, 77, at Marengo, Ill., June 16, 1958.
LYMAN B. JACKES, ONT '20, at Toronto, Ont., May 21, 1958.
WILLIAM R. JACKSON, KSC '46, 34, at Rogers, Ark., June 30, 1958.
PHILLIP K. JONES, UP '98, 82, at Pittsburgh, Pa., June 23, 1958.
EUGENE M. JOSLIN, ONT '08, at Perry, Mich., Nov. 11, 1958.
HENRY T. JUEN, CHI '13, 70, at El Paso, Texas, June 14, 1958.
ALEXANDER JUNKUNC SR., at Mt. Prospect, Ill., June 12, 1958.
JAMES C. KING, STJ '23, 73, at Hopkinsville, Ky., July 27, 1958.
FRED MAIN, GR '08, 82, at Albion, Mich., June 10, 1958.
ANDREW J. MALMAS, ONT '16, at Edmonton, Alta., May 26, 1958.
E. C. McCONNELL, IND '10, 89, at Cynthiana, Ind., May 21, 1958.
A. F. McGREEVY, GR '15, 72, at Sioux City, Iowa, July 10, 1958.
HAROLD B. McMURRAY, COR '24, 64, at Owego, New York, recently.
W. A. NANNERY, West Roxbury, Mass., recently.
HOWARD McCLURE NEDEAU, ONT, at Miami Beach, Fla., June 22, 1958.
L. V. NEWMAN, KCV '12, 70, at Racine, Wisc., June 24, 1958.

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the Polyester-foam padded aluminum splint.

In 18-inch lengths in ¾ or 1-inch widths. Cuts to required length with ordinary scissors. Packed 12 of one size in box.

¾-inch ..... $7.50 per box
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A Professional Line product sold only to Veterinarians

For Milk Fever and Complicated Cases
Provides Ca, P, Mg In Metal Organic Form—Extends Therapeutic Action
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NORCALCIPHOS

For better milk fever therapy

1. Longer, more effective therapeutic action because calcium, phosphorus and magnesium are in metal-organic form—in contrast to rapidly eliminated, irritating inorganic compounds.

2. Magnesium is available as magnesium gluconate—less irritating and more slowly ionized than magnesium chloride.

3. Unexcelled results in complicated cases. Balanced formula of calcium, magnesium, dextrose and phosphorus is especially valuable in complicated cases and in helping to prevent relapses.

4. Exceptional stability. No troublesome precipitation to slow up treatment. Non-precipitating even after freezing.

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Supplied In: 12—500 cc.

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There is obviously a definite advantage in the use of a disinfectant in your practice that does not leave an obnoxious odor about the clothing, person or premises.

In addition to fulfilling this requirement, ROCCAL is

- Detergent and Cleansing
- Nonirritating to the Hands
- Economical

DEPENDABLE DISINFECTANT

Wide Range of Usefulness

ROCCAL is eminently useful as a germicide. It is not for surgical use but is intended for the general disinfection of floors, walls, kennels, stables, milking equipment, operating tables, furniture, wash tubs, eating and drinking utensils.

ROCCAL 10% SOLUTION supplied in 1 pint, 1 quart and 1 gallon bottles.
ROCCAL 50% SOLUTION supplied in 5 gallon containers.

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ROCCAL®

DEPENDABLE DISINFECTANT

Roccal, trademark reg. U.S. Pat. Off., brand of sanitizing agent (active ingredient—benzalkonium chloride, technical, 10%; inert ingredients, 90%).

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DIZAN* tablets

dithiazanine iodide, CSL

Dizan Tablets offer the veterinarian a new, exclusive, broad coverage treatment for the common helminthic infestations of dogs and cats. Practitioners appreciate the safety and efficacy of Dizan, as it is gentle to animals, yet its removal of the worm burden approaches 100 per cent. Because Dizan is not a one-dose purger, there is an added advantage of not upsetting the schedule of pet or household. Dog breeders, too, will appreciate your mention of Dizan.

A 5 to 10-day treatment removes large roundworms, hookworms, and whipworms. Correct daily dosage is easily estimated — 10 mg. per pound of body weight given daily, preferably at or after feeding. Dizan is supplied in tablets of 50, 100, and 200 mg., packaged 100 tablets per bottle.

*T.M.

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